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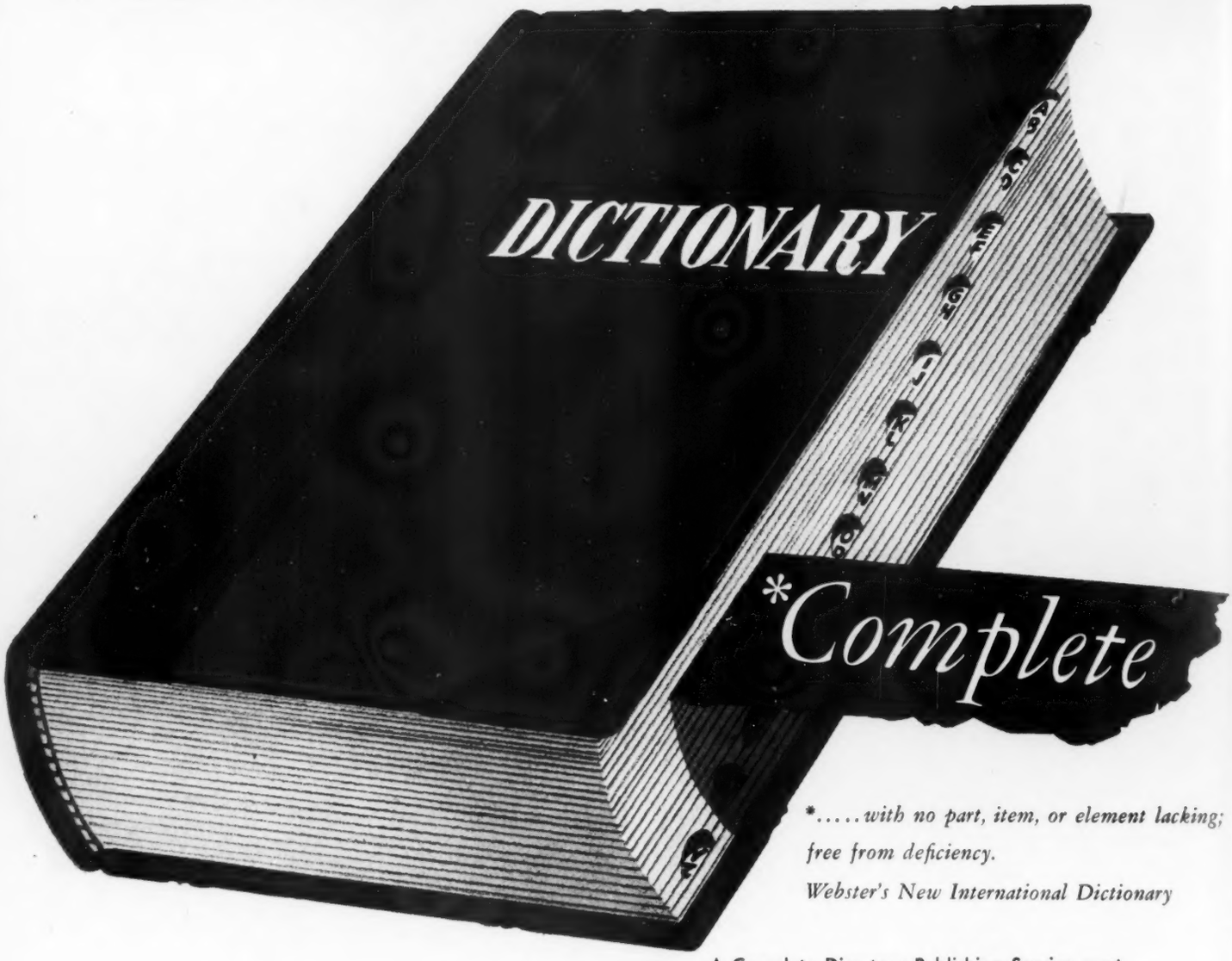
By John S. Reed

THE NATIONAL TELEPHONE MAGAZINE



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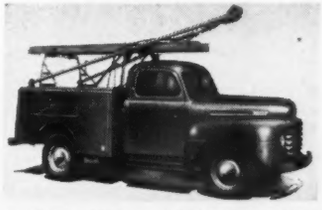

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Across The Editor's Desk

J. T. NAYLOR, vice president and general manager of the Sunland-Tujunga Telephone Co. (Calif.) has been named president of the Telephone Service Co., Kirkland, Wash., succeeding the late EARL W. GATES.

• • •

The appearance of FRANK WOODS at the Golden Jubilee Convention of the Nebraska Telephone Association brought one of the real pioneers of Independent telephony before the younger men of the industry. His talk during the program will serve as a guiding beacon to those that follow.

• • •

Our hat is off for a bow to the Small Company Committee of the Iowa Independent Telephone Association. At their convention last fortnight the report of this Committee was a highlight of achievement. The Committee is larger than those of other state telephone associations and each section of the state has a number of Committee people working to aid and assist the smaller companies. W. F. (BILL) MILLER, the association secretary is also to be congratulated.

• • •

JOHN S. REED is a familiar author to TELEPHONE ENGINEER readers. We are proud of his being on our team. In his article in this issue, (which is the first of six installments) is to us an outstanding job of writing and a series that will be of utmost importance to the Independent segment of the telephone industry. "Rebuilding the Rural Outside Plant" is the title—we would like your comments.

• • •

It has been noticed that attendance of each succeeding state telephone association has included more telephone companies than in past years. The many subjects of importance to our industry are receiving attention on the programs and has been the prime factor in increased attendance. In this respect we wish to commend Mr. Clyde McFarlin, president of the Iowa association, on the work of that association and for his report to the convention.

The National Telephone Magazine

TELEPHONE ENGINEER and MANAGEMENT

APRIL, 1950 **VOL. 54, NUMBER 4**

Editor, **RAY W. SMITH** • *Advertising Director,* **ROY F. SMITH**
Managing Editor, **JOHN G. REYNOLDS** • *Promotion Manager,* **DON C. SORENSEN**
Washington Bureau, **ROLAND C. DAVIES** *and* **FRED HENCK**
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Front Cover: Wet Work—Plant men of the Southern New England Telephone Co. on the New London side of the Niantic River wait signal from crew on the opposite bank before reeling out more cable. New submarine cable—part of the New Haven-New London span—went in recently as a permanent replacement for a cable which had chaffed against bridge pilings with the ebb and flow of tidal currents and sprung a leak.

Seen at work on the job are Donald C. Neilan, John P. Caulkins, F. W. Levitsky, Harry E. Chapman, Roy Wilson (beside Chapman), Robert Workman, Leon C. Meeker, Daniel E. Neilan and Peter J. Acton.—(Courtesy THE TELEPHONE BULLETIN.)

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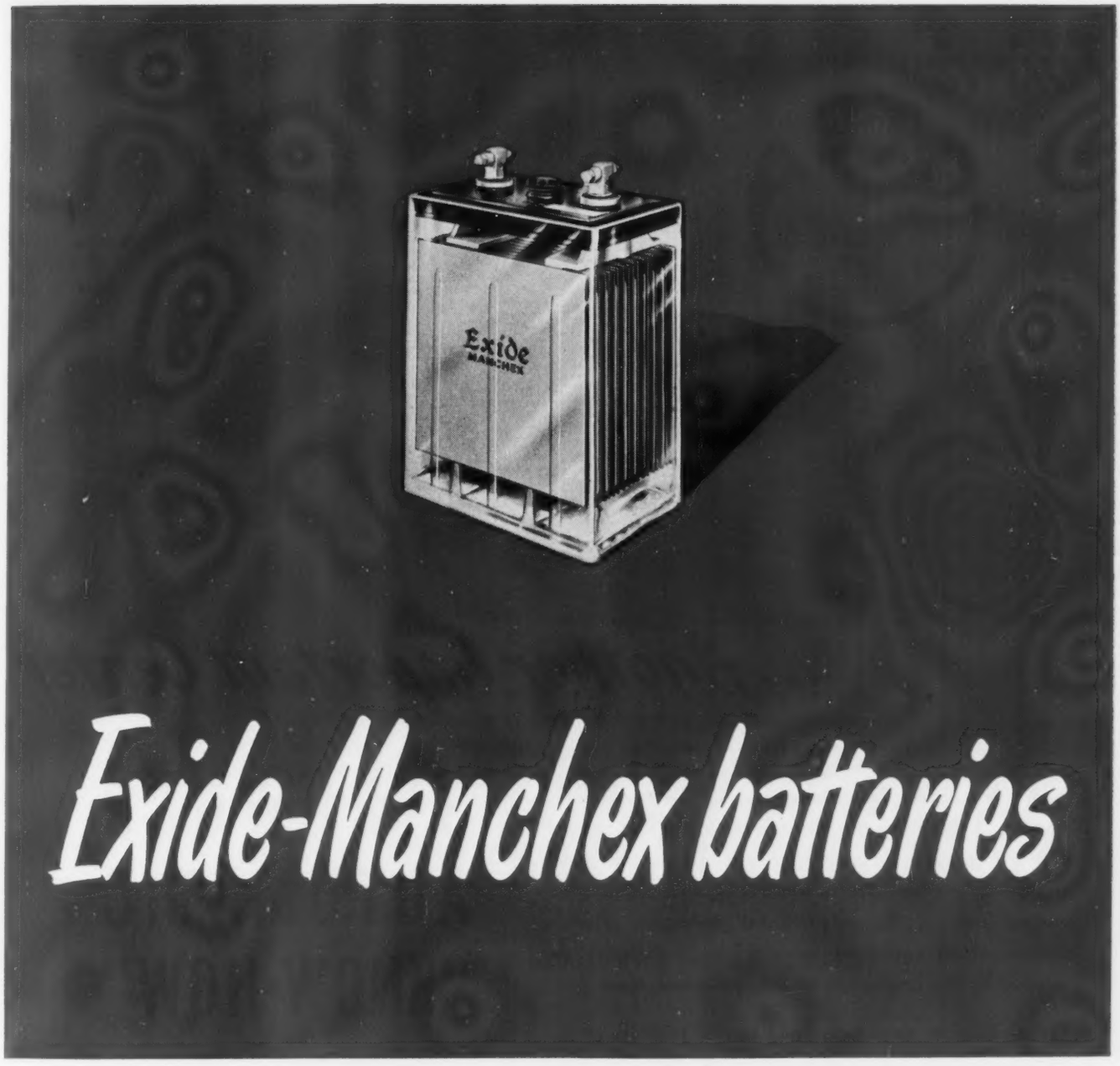

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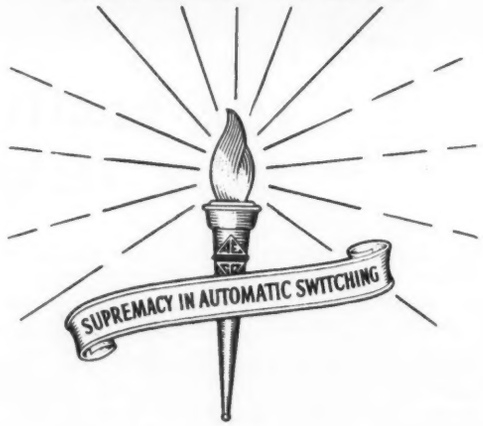

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Fortnightly TELEPHONE ENGINEER ★ TELEPHONE ENGINEER AND *Management*

ON THE 1st OF EACH MONTH ON THE 15th OF EACH MONTH

NEWSLETTERS *on Alternate Weeks*

April 15, 1950

Dear Sir:

Proposed investigation of interstate crime by Senate Judiciary Committee is expected to be given Senate approval in immediate future. Rules Committee endorsed proposal. Judiciary Committee, reportedly, already is sending investigators into major cities to study use of communications for bookmaking purposes, interstate transportation of slot machines & similar matters which would be subjects for probe. Rules Committee decided not to give jurisdiction for study to Interstate & Foreign Commerce Committee. Chairman Johnson (D. Col.), of latter group, said he would not press matter in floor debate, although he might later ask for funds for separate investigation by his committee.

* * *

Communication Workers of America began circulating its proposals for new union structure among membership of union, marking next to final step in adoption of recommendations of special constitution committee & CWA executive board. Delegates at next convention, in June at Cleveland, will vote on proposals.

As proposed, first major step in structural change would be that locals of CWA would be chartered directly by executive board & divisions of union would no longer exist. Secondly, service to locals by international would be rendered directly with establishment of nine administrative districts on geographical basis. With regard to administration of union affairs, locals would be assigned to districts in which they maintain their headquarters & locals within any district would elect directors at international convention. District directors would be members of CWA executive board so that direct governing of union affairs, outside conventions, would come from CWA international. Latter step would mean that contracts with Bell System & Independent telephone companies would be held by international which would, CWA said, "be responsible for negotiations and enforcement."

* * *

Current issue of Automatic Electric Technical Journal, published by Automatic Electric Co., is devoted entirely to article on application of Strowger automatic toll ticketing & punch card toll accounting in metropolitan telephone systems. Article was written by J. T. Naylor, general manager of Sunland-Tujunga (Calif.) Tel. Co., whose company has installed Strowger system of toll ticketing in Sunland exchange.

* * *

New Common Carrier Bureau of Federal Communications Commission has been given remainder of its top structure of division chiefs & other key

officials. Commission approved appointments of Jack Werner, ass't. chief of Common Carrier Division of Bureau of Law, to be Common Carrier Bureau assistant chief; Curtis M. Bushnell, assistant chief, Accounting Bureau's field division, to head Telephone Division; Marion H. Woodward, ass't. chief engineer (common carrier) to be international division chief; John R. Lambert, chief, Tariffs & Telephone Rates Branch, Bureau of Accounting, to be Telegraph Division chief; Charles R. Makela, chief, Accounting Field Division, to be chief, Field Coordination Unit in new Statistics Division, to Statistical Division Chief.

* * *

In addition to Jordaphone Corp. of America & Mohawk Business Machines Corp., producers and distributors of "Telemagnet," another distributor of foreign attachments will be represented in FCC hearings on complaint against foreign attachment provisions of Bell System companies' tariffs, slated to begin April 25.

FCC March 21 granted the petition of Electronic Secretary, Inc., developer of automatic portable telephone answering device of same name, & Electronic Secretary Industries, Inc., of Milwaukee, producer & distributor of equipment, to intervene in case.

* * *

E. F. McNaughton, Public Utilities Director of California Commission, is to be speaker at 28th annual conference of State Utility Commission Engineers in Washington April 18-20 with address on "Activities of the Subcommittee of Staff Experts of the NARUC Special Telephone Committee," which he heads.

Another address of interest to telephone field will be that of Ohio Commission Chief Engineer Paul E. Reed on new Cleveland metropolitan telephone rate plan, put into effect by Ohio Bell Tel. Co. J. W. Kushing of the Michigan Commission is giving report on "Use of Statistics and Statistical Methods & Procedures." Connecticut Commission chief engineer E. C. Nuesse is pres. of this year's conference; Lynn B. Curry of Pennsylvana Commission is in charge of program arrangements.

* * *

HIGHLIGHTS . . . Osage Tel. Co., Osage City, Kan., purchased three rural lines; will rebuild & install new telephones . . . Reno Tel. Co., Inc., Abbyville, Kan., granted charter; $60,000 capital stock; incorporators are J. J. Gagnebin, John R. Wagler, Vesta M. Gagnebin, Esther E. Wagler, all of Abbyville. . . . R. M. Goodman, Marietta, Ga., purchased Johnson County Tel. Co. & Valley Tel. Co., Paintsville, Ky. . . . Farmers Tel. Co., completed installation of automatic system at Pfeiffer, Kan. . . . Telephone Service Co. installed new swbd. position at Edmonds, Wash. . . . Vern Larsan, plant supt., Pioneer Tel. Co., Howard Lake, Minn., joined Sussex County Tel. Co., Newton, N. J., as gen. mgr. . . . Breda (Ia.) Farmers Co-op Tel.Assn. completed $40,000 modernization project.

Ray Smith

Ray W. Smith, Editor

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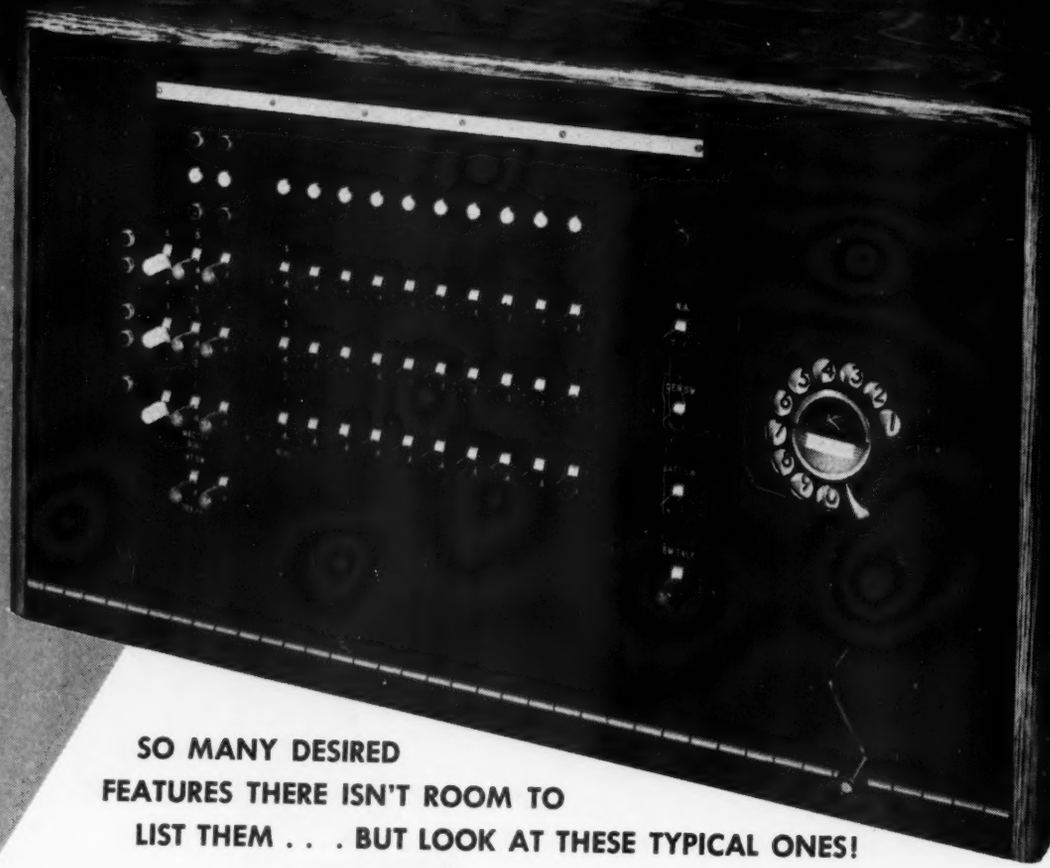

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- Provides re-ring on incoming trunk connections.

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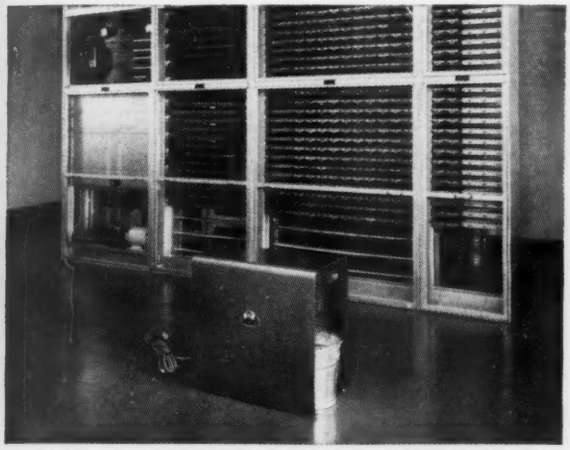

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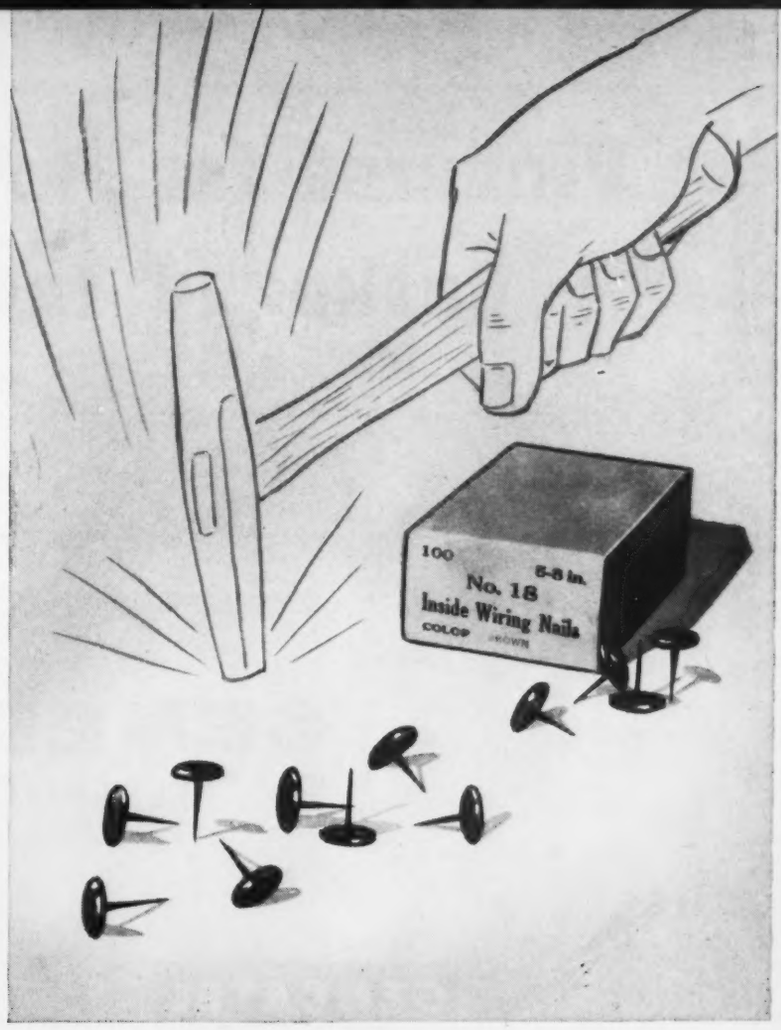

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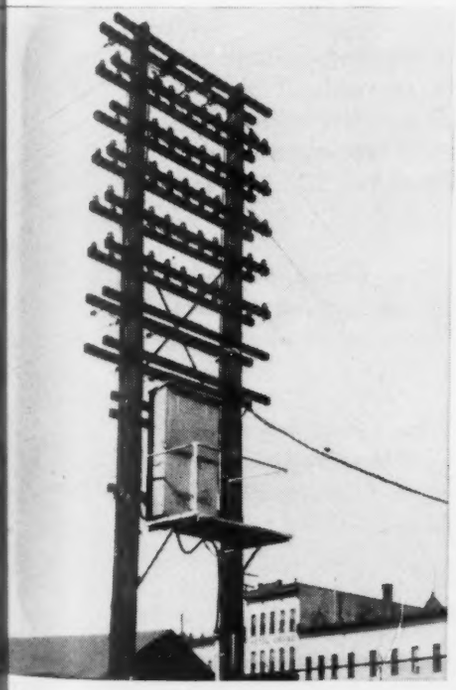

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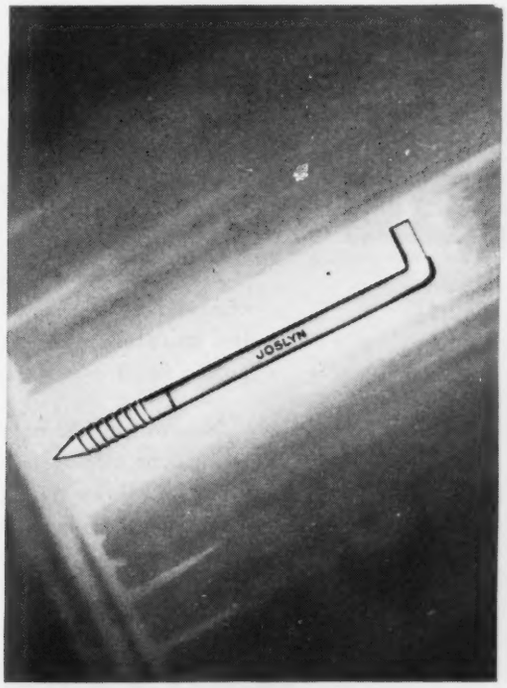

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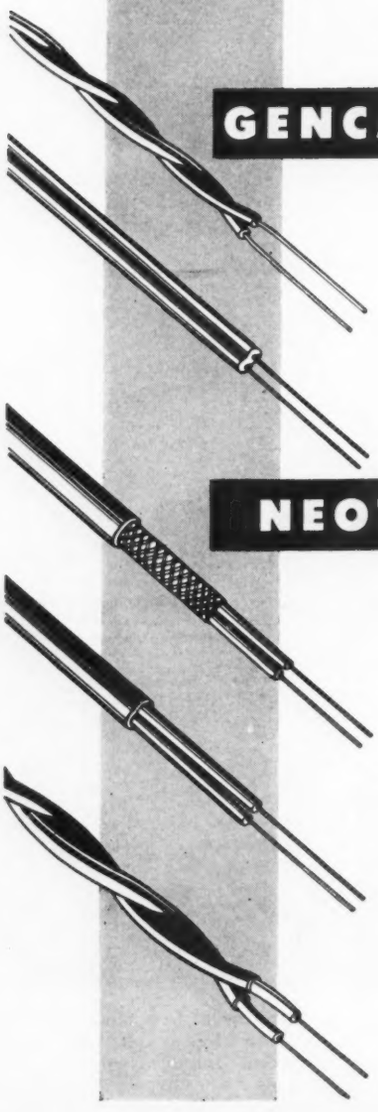

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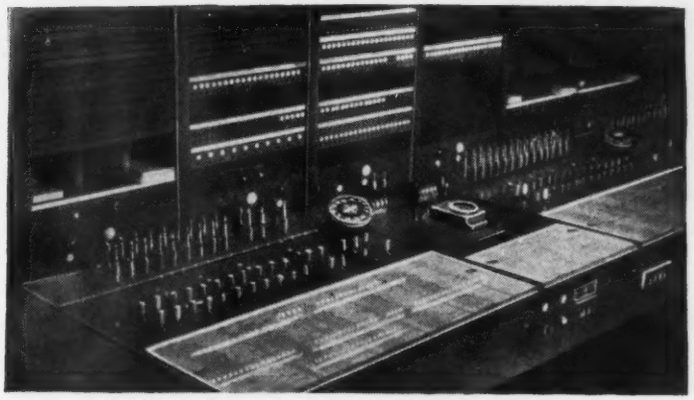

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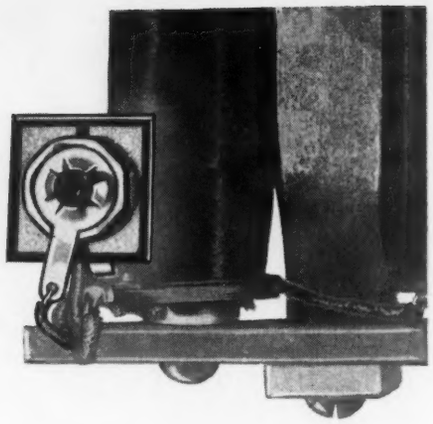

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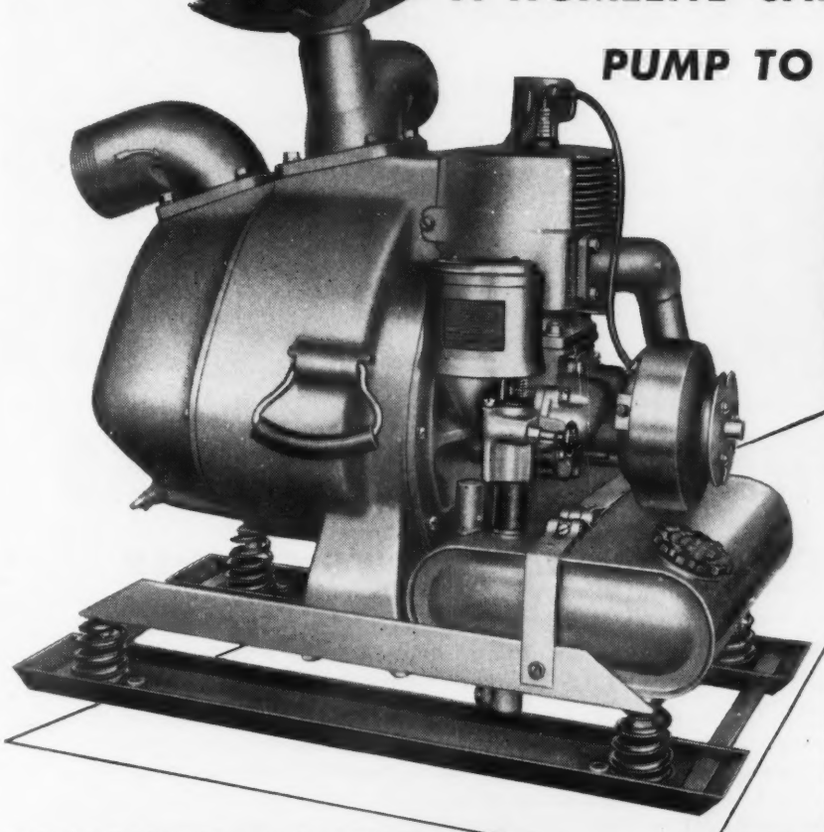

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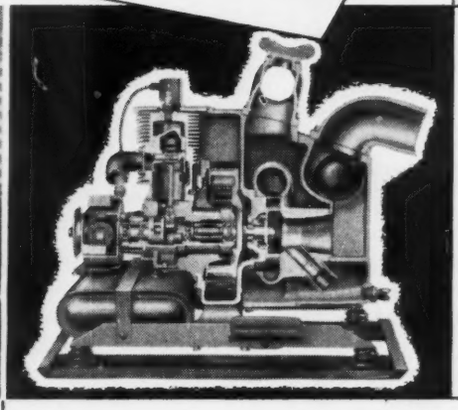

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EDITORIAL

Telephone Construction Is In High Gear

DURING THE war a lot of people spent a lot of time trying to figure out what postwar conditions would be in various lines of business. We doubt, however, if even the most optimistic prognosticator on the telephone business had the nerve to forecast a postwar growth as tremendous as the actuality has turned out to be.

The postwar demand for telephones has been—and continues to be—so great and so continuous that it can no longer be believed that it is simply a process of catching up with demands for service that could not be met during the war. All signs point now to the fact that there is a greater demand for telephone service now, per capita, than there ever was, at any time, before the war.

Signs indicate, too, there will continue to be a heavy demand for more telephones. When you study those signs, it seems reasonable to believe that about the only thing that would halt that demand would be a depression or serious economic recession in this country. And there are many signs that indicate that we do not need to worry about such happenings as that—at least in the reasonably seeable future.

For instance, reports are that there will be nearly a million, and possibly even more than a million, new houses built in this country in 1950. This number of new houses represents, of course, a large potential demand for additional telephones.

Industrial production is high and is still rising in some lines. Prices, generally speaking, are becoming more stabilized. Industrial employment remains high, and so do wages. More people can afford telephones now —even at the higher rates that have been established at many exchanges —than ever before. And people seem to want telephones more than they ever did before.

You can't install more telephones without the equipment and plant to serve them. In most cases that means more equipment and plant than the company has now available. There were practically no spare telephone plant facilities at the end of the war and, since then, about all most telephone companies have been able to do—especially in the larger towns and cities—is to extend facilities fast enough to keep up with current demand. Some have not been able to do even that.

The natural consequence of this situation is that telephone construction must stay in high gear, even to keep up with the demands for expansion. And, in addition to that, a tremendous amount of construction is needed for other purposes—rehabilitation, modernization and so on.

It is obvious that, under these circumstances, the manufacturers and suppliers of telephone equipment and materials, as well as the telephone company buyers and users, are going to be a very busy set of people for some time to come—and certainly, it seems reasonable to believe, during the whole of 1950.

We are now experiencing in this country a growth of population much more rapid than the experts on such matters forecast a decade ago. The country already has—and before the time forecast for that—more than 150 million people. The telephone is becoming, all the time, more and more integrated into the daily lives of those people; more and more necessary to them.

This combination of many more people and, at the same time, the growth of the "telephone habit", means that telephone companies must be prepared to grow and grow and grow. And that means that telephone construction must necessarily stay in high gear.

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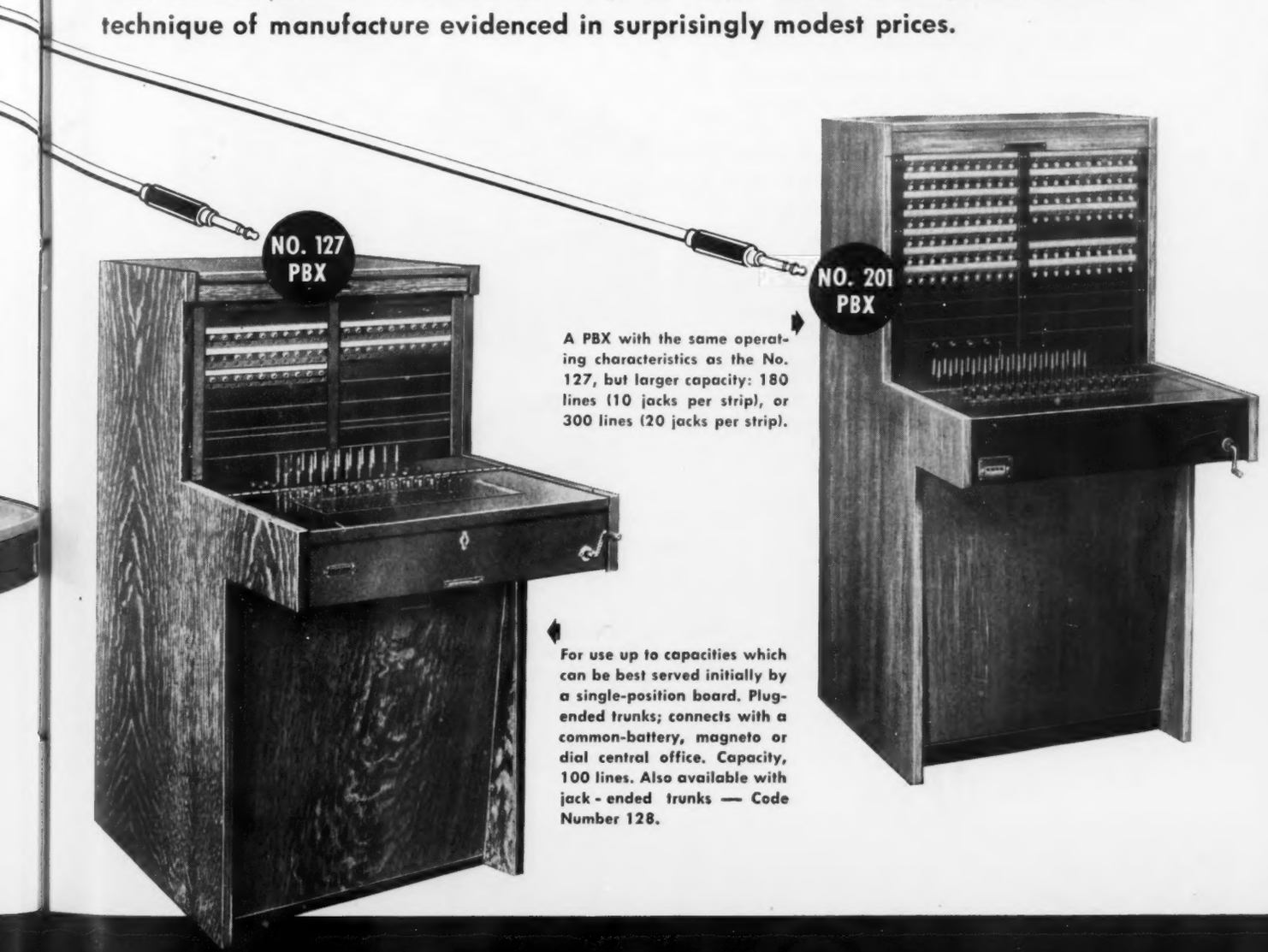

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OVER 40 YEARS' *Service* TO THE TELEPHONE INDUSTRY

WASHINGTON BUREAU REPORTS

by Roland Davies and Fred Henck

Final House Action on general appropriations expected to provide indicator of scope of REA Farm Telephone Loan program . . . FCC releases recommendations on foreign attachments.

A very good indication of the scope of the farm telephone loan program of the Rural Electrification Administration for the coming fiscal year, starting July 1, probably will be available soon after the House of Representatives returns from its Easter recess on April 18.

The cue will come in final House action on the general appropriations bill for the 1951 fiscal year, and in voting on the proposal of its Appropriations Committee that REA telephone loan funds be cut to $25 million for the coming fiscal period, rather than the $50 million asked by the agency and approved by the Budget Bureau.

At the same time, the House will also take final action on a companion recommendation of the Appropriations group that administrative funds for the REA telephone program be cut from the $2.1 million asked to $900,000.

If the House approves the Appropriations Committee recommendations—and there is an excellent chance that it will do so, in view of growing economy sentiment and the probability of a growing federal deficit when excise taxes are reduced—the telephone loan program will function at a level very much below the expectations of the agency. Since REA cannot build up its staff to its previously-expected level before the start of the next fiscal year, only to have to dismiss half the personnel, the House action also would have a very pronounced effect on loan approvals for the remainder of the current fiscal year.

Although no reliable estimates are available, it appears that REA already has received loan applications for more loan money than the total it will have available for the entire period through June 30, 1951. The total, of course, is $50 million, with the $25 million authorized for the current fiscal year and the $25 million proposed for the coming period.

REA Administrator Claude Wickard already has stated that the initial loan applications received averaged $170,000. If that average held up, then the REA even by the end of March had received requests for $55 million. The total cannot be considered by any means an accurate estimate of what REA would approve if all the loan requests were granted, since the agency frequently revises borrowers' estimates either up or down. But it is considered important for rough comparative purposes.

Since the agency has received upwards of 350 loan requests, each requiring considerable engineering and other study, there are obvious conclusions to be drawn if the House Appropriations Committee recommendation is upheld by Congress.

Processing of loan requests will be slower; total amounts granted will be scrutinized more carefully, with more of an eye toward immediate and urgent needs; and the nation's telephone companies perhaps will have more time than was previously expected to consider expansion of their service areas in rural territory.

Incidentally, if the House goes along with the Appropriations Committee, there is not expected to be too much of a drive in the Senate to restore the REA telephone funds.

Meanwhile, the REA has issued its third rural telephone loan, to the Pattersonville Telephone Co., Rotterdam Junction, N. Y. The company has been given an allocation of $95,000 for improvement of its facilities for the present 438 subscribers and extension of service to more than 100 applicants waiting for connections.

The loan will be used to modernize the company's system and build 7¼ miles of new line. The modernization will be planned to accommodate another 200 subscribers, the REA said, in addition to those on the held order list, who are expected to apply for service in a few years, as a result of new home construction under way in the area.

The company, the REA reported, has reached an agreement with the

New York Telephone Co. which, if approved by the state Public Service Commission, will eliminate the present toll charge for calls between Rotterdam Junction and nearby Schenectady.

Foreign Attachments

IN WHAT may have been a significant statement of philosophy on foreign attachments for telephones, the Federal Communications Commission attorneys who participated in the recently-concluded Hush-A-Phone hearings have recommended that the Commission refuse Hush-A-Phone's request that the nation's telephone companies be required to permit the use of the device specifically in their tariffs.

The recommendations came in the form of proposed findings and conclusions submitted in the case. Under the recent revisions of FCC procedures, the Commission General Counsel is permitted to file findings and conclusions, as do the interested parties in FCC proceedings. The Hush-A-Phone conclusions were filed by Harold J. Cohen, Chief of the new Commission Common Carrier Bureau, and Bernard Strassburg, the FCC attorney in the hearings.

Although the Hush-A-Phone, a plastic device fitted over the mouthpiece of a telephone to prevent persons nearby from hearing what is spoken into the telephone, and also to muffle room noises, generally does not fit instruments made by Independent telephone manufacturers, the FCC attorneys' conclusions were considered important as a staff policy statement.

They were particularly important because another foreign attachment case, involving two electronic answering devices which play recorded messages to callers when the called party does not answer his telephone, and record messages—the Telemagnet and the Electronic Secretary—is slated to start April 25.

"It is clear from the record of the hearing," the FCC attorneys said, that "use of the Hush-A-Phone device for the primary purpose for which it is designed, namely, privacy, is accompanied by an impairment in the quality of telephone communication. Such impairment takes the form of reduced intelligibility of the Hush-A-Phone user's speech as it reaches the ear of the listening party as a result of the alterations of the components of such speech which takes place as it passes through the acoustical chamber of the Hush-A-Phone device into the transmitting apparatus of the telephone instrument.

"Although it is not possible on the basis of the record to measure the exact magnitude of impairment in this regard, it is significant that as the amount of privacy accomplished by the use of the Hush-A-Phone increases, the user's speech becomes increasingly unintelligible. The general, unrestricted use of the Hush-A-Phone device could result in general deterioration of the quality of interstate and foreign telephone service. Accordingly, it is not an unjust and unreasonable practice upon the part of the defendants to prohibit its use in connection with telephone services."

Mr. Cohen and Mr. Strassburg went on, "It may be argued that the foreign attachment provisions of (the Bell System companies') tariffs, insofar as use of the Hush-A-Phone device is concerned, constitute a restraint upon the inherent freedom which the customer necessarily enjoys with respect to the character and content of his telephone communications. However, such restraint is not unreasonable in view of the fact that use of the Hush-A-Phone device affects the quality of telephone service furnished by (the companies) to not only the Hush-A-Phone users, but to all other subscribers who are connected with the same nationwide telephone system and who may call or be called by such Hush-A-Phone users.

"Because of their effects upon telephone transmission and reception, widespread use of Hush-A-Phone devices would result in a general lowering of the quality of service now available to the public. Inasmuch as it is the Commission's responsibility to maintain the highest possible quality of telephone service, no action should be taken by the Commission which might result in a deterioration of that service."

The FCC attorneys recommended, however, that the telephone companies' foreign attachment tariff provisions should be revised " by removing the element of discretion" of the companies in discontinuing service because of subscribers' use of foreign attachments.

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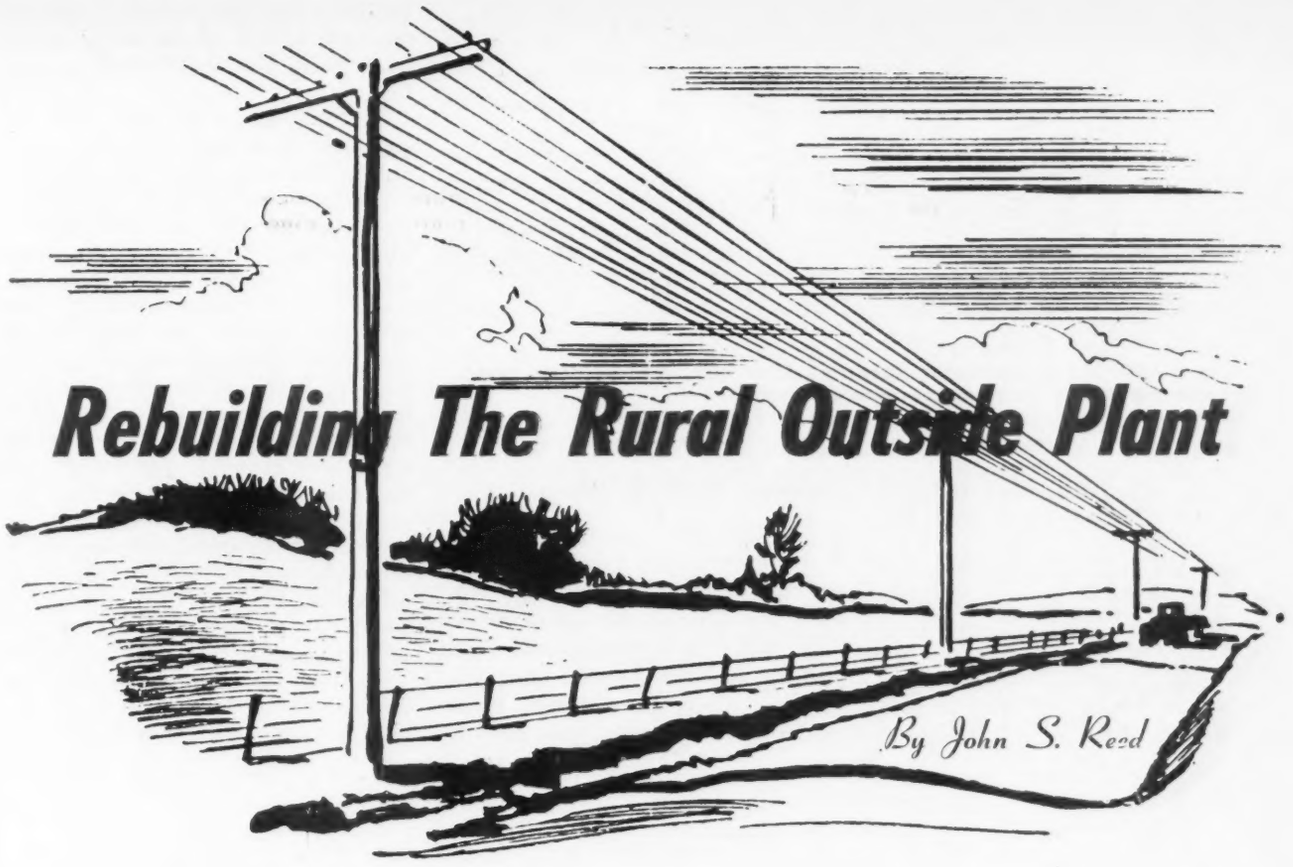


Rebuilding The Rural Outside Plant

By John S. Reed

In this first article of a six part series, Mr. Reed describes preliminary steps in rebuilding the outside plant of a small company.

DURING THE post-war years, telephone companies throughout the country have been under unprecedented pressure to extend their service to former subscribers and to prospective subscribers, who never before had a telephone in their homes. This situation is evident everywhere in cities and towns, and rural communities are no exception. In the case of rural areas, the demand for more and better telephone facilities arises chiefly from a greatly increased farm purchasing power. With more money to spend for better things, farmers are becoming critical of their present telephone service and want improvements that will give them service approximately equal to that available in metropolitan areas.

Even during the war years the larger telephone companies have maintained their rural telephone service at a reasonably satisfactory level. Unfortunately, the smaller companies, especially those in sparsely settled regions, have not done so well. Not having a sufficient return from the low subscriber rates, they have not been able to keep up the telephone plant. The result is that much of the outside plant in rural communities served by these companies is in a badly deteriorated condition.

The restoration of this run-down plant to good working condition is a very important step towards the re-establishment of satisfactory telephone service. Regardless of whether dial, common battery, or magneto service is to be rendered to the subscribers, the rehabilitation of outside plant should be placed ahead of the repair or replacement of the central office equipment.

This article will describe the rebuilding of the outside plant of a telephone company in a mythical village centering in a small rural community, comprising approximately 250 farm and 350 town people. This company is owned by stockholders, some of them well-to-do farmers, and the rest substantial tradespeople in this area. Since the depression, the company had been struggling with the problem of maintaining its lines, all of them of the ground return variety. Because of the erection of power lines throughout the area, many of the telephone lines have become almost useless, due to severe noise induction. With the return of prosperity to the community, farm and townspeople cast critical eyes on their antique telephones and have been grumbing about the terrible service they are getting these days. The stockholders, sensitive to this criticism, have been meeting together a number of times and have finally decided to really improve the service. With the help of an experienced telephone man, they are now embarked on the task of rebuilding their outside plant.

Before proceeding with the inspection of the plant to determine the work that must be done and the material that must be obtained for the job, several preliminary steps should be taken in the order indicated; namely, clearing the right of ways, solicitation of non-subscribers, and regrouping of present and potential subscribers. The sequence of

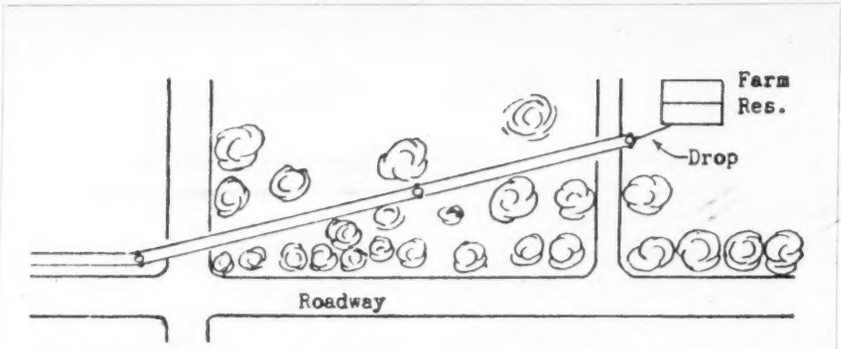


Fig. 1—Method of routing an open-wire farm spur to clear dense tree growths paralleling the road and farm driveway.

these steps is important to avoid confusion and to assure economy of time, effort, and money.

The writer wishes to express his appreciation to *George P. Barney, Assistant to the General Plant Superintendent, The Lincoln (Neb.) Telephone and Telegraph Company*, for advice and help given him in preparing the article.

Clearing Right of Ways

IT IS OBVIOUS that the inspection, rebuilding, and future operation and maintenance of the open-wire leads would be greatly hampered by trees, underbrush, coppice, and weeds growing profusely under and up into the line wires. In all cases where this is at all possible, such growths should be completely eradicated along the right of way of the leads, rather than being merely trimmed or cut back.

At first sight, this may seem an enormous task and one that may arouse the opposition of adjacent property owners, who wish to retain the better growths for wind breaks. The company representatives, however, can interview each owner and discuss the proposed clearance work with the owners, explaining that it is to theirs and the company's advantage to have the growths removed for the long period of freedom from line troubles resulting from contact with tree growths, particularly in the case of dial lines, which are easily affected by line leakage.

A strong argument that appeals to thrifty farmers is that they can obtain additional land in this manner on which to raise crops. They can be invited to utilize the space under the line wires right up to the ditch or embankment lining the road for this purpose. This permanent use of

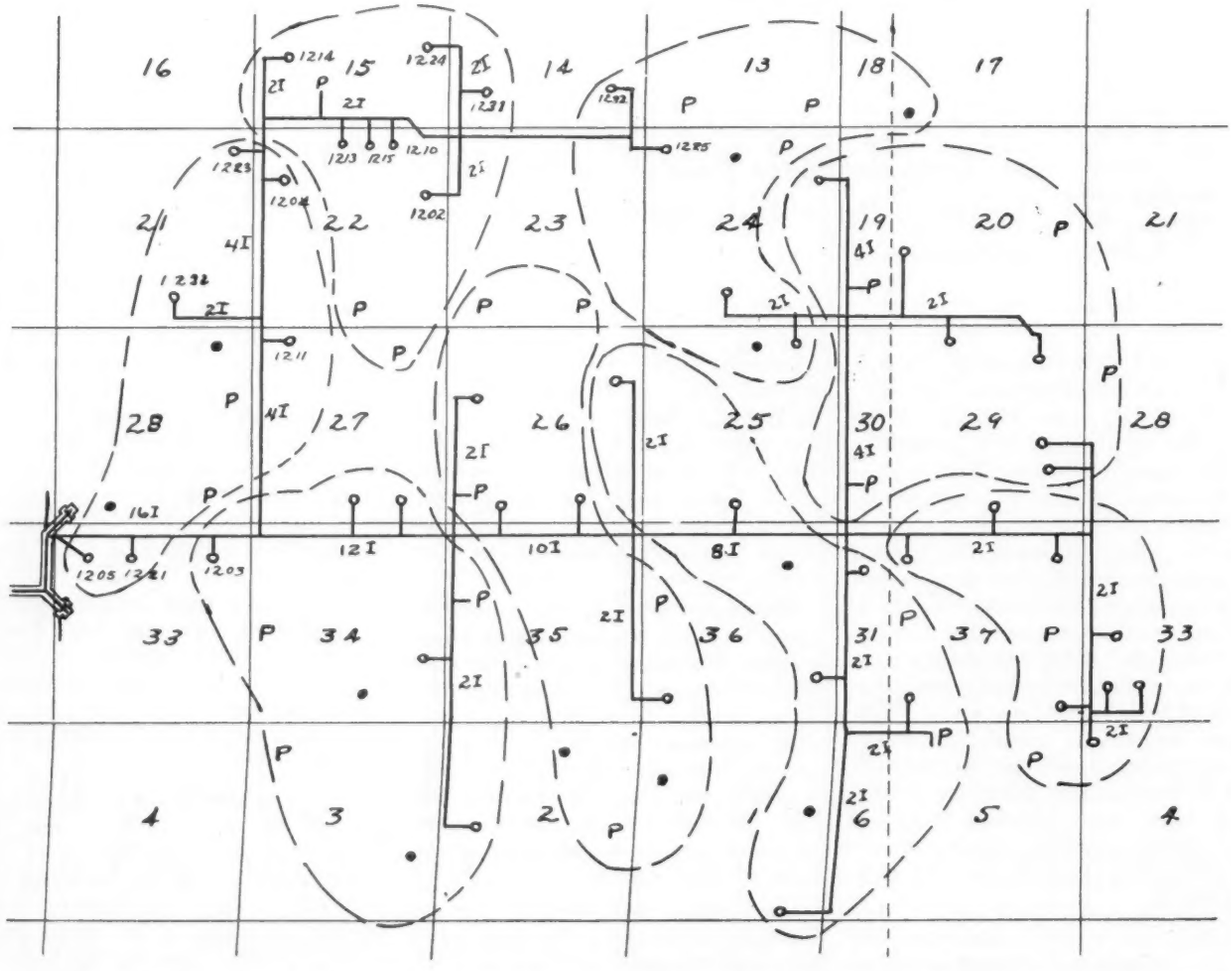


Fig. 2—Portion of rural plant record map showing method of grouping present and prospective subscribers.

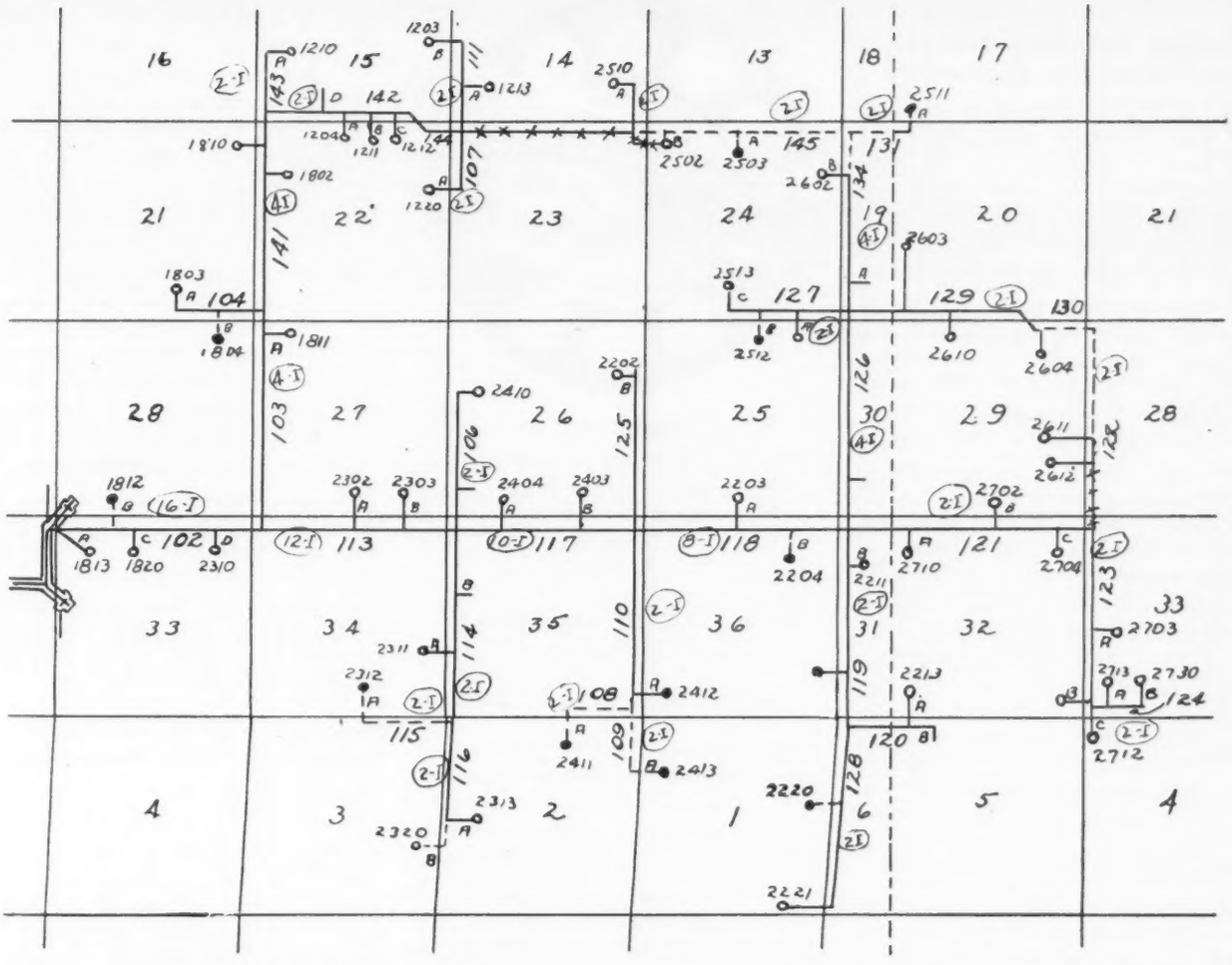


Fig. 3—Portion of rural plant record map revised for use in the inspection of the outside plant. Dashed line along route of pole lead indicates wire lines to be placed and crossed out lines represent wire lines to be removed. Solid lines represent the routing of the present leads to be retained.

the right of way for crops has the further advantage of preventing the breeding of insect pests and disease-producing fungi, which exist only if they can find lodgement in undisturbed underbrush and weed trees lining the crop area. This arrangement necessitates the placing of taller poles, usually 20 foot, to provide the required ground clearance. The expense of these taller poles is, however, more than offset by the elimination of tree trimming and brush removal expense.

The expense of clearing the right of ways can be reduced by having the farmers share the cost of doing the work. Many are glad to share, if they can do the job themselves or if they can obtain someone who has a bulldozer that can be used to completely remove the growths. Farmers are making increasing use of weed killing chemicals in their regular work and they can employ their spraying equipment for this purpose, with the telephone company paying one-half the cost of the chemicals plus an amount equal to one-half the farmer's time for the work. Care should be taken to use only the chemicals that have proved to be effective in the farming area for destroying woody plants.

When a property owner will not consent to complete removal of trees and underbrush from the right of way abutting on his property, several alternatives are suggested in the descending order of desirability indicated below.

(a) Obtaining private right of way from the property owner. (Requires the signing of an easement by the owner.)
(b) Placing extension arms on poles to keep line wires away from trees.
(c) Placing taller poles.
(d) Trimming the trees (requires a signed permit from the owner).

A private right of way can be obtained by getting the owner's agreement to locate the wire lead inside his property line, away from the growths along the public right of way. This usually results in offsetting the line perhaps ten or fifteen feet from the boundary line and inside it. In this case, the poles would have to be a minimum of 20 feet high, depending on the number of wires carried. In some situations it is possible to bring the wires at the end of a spur line into the property in the manner indicated in *Figure* 1 and thus avoid dense tree growths lining the road and driveway to the farm house.

In situations where the trees are valuable to the owner, extension arms or taller poles, or both, are needed to adequately clear the trees. In a few cases trimming may be a solution to the problem, as in the case of tall trees of the upright variety, such as the elm, that can be undertrimmed

with the wires strung under the lowest branches.

Soliciting Telephone Service From Prospective Subscribers

ON COMPLETION of the right of way clearance work, the next step is to solicit prospective subscribers for telephone service. Every family in the area should be canvassed, regardless of whether they ever had telephone service in the past.

If the solicitation is not sufficiently thorough, there is danger that the company will continue to receive orders after all the lines have been erected and the central office equipment has been installed. While central office equipment can be expanded to a reasonable degree, it is more difficult to add more cable pairs and open-wire circuits when the capacity of these circuits is limited, as is likely to be the case in small communities. Forced expansion of telephone service after a rebuilding program is very expensive. It is really more economical to spend some time in contacting prospects and delay placing new cable and open-wire circuits and determining central office equipment requirements until the last prospect has been given reasonable time to make up his mind to take the service.

Advertising should be carried in the local papers announcing the intention of the telephone company to modernize its service and urging farmers and townspeople to place orders for telephone service in advance of the rebuilding program. The following advantages can be stressed in the newspaper advertising and in discussions with prospects:

(a) If the exchange is being converted for dial service, 24-hour telephone service can be guaranteed.

(b) Help can be summoned in case of an accident or a fire on the farm.

(c) Merchants, bankers, and distributors can be contacted regularly for the transaction of farm business, servicing of farm equipment, and the ordering of supplies for the farm.

(d) Employment agencies can be contacted for hiring farm help.

(e) In work interchange programs, such as harvesting, threshings, and barn raising projects, neighbors can be called individually or on a general line ring.

(f) Social visits can be arranged or carried on via telephone.

The important point to bring out in explaining the foregoing advantages to a rural prospect is that the telephone enables the busy farmer to save much time and money in the completion of his innumerable errands and thus increase his own personal efficiency.

PART TWO
of Mr. Reed's Series
"Rebuilding The Rural Outside Plant"
Will Appear In The May
FORTNIGHTLY TELEPHONE ENGINEER

Regrouping of Present And Prospective Rural Subscribers

THE NEXT step, following the solicitation of subscribers, is to regroup present and prospective subscribers in the exchange area. The purpose is to determine the minimum number of lines that will provide the rural subscribers with a good grade of telephone service. This information

(*Please turn to page 70*)

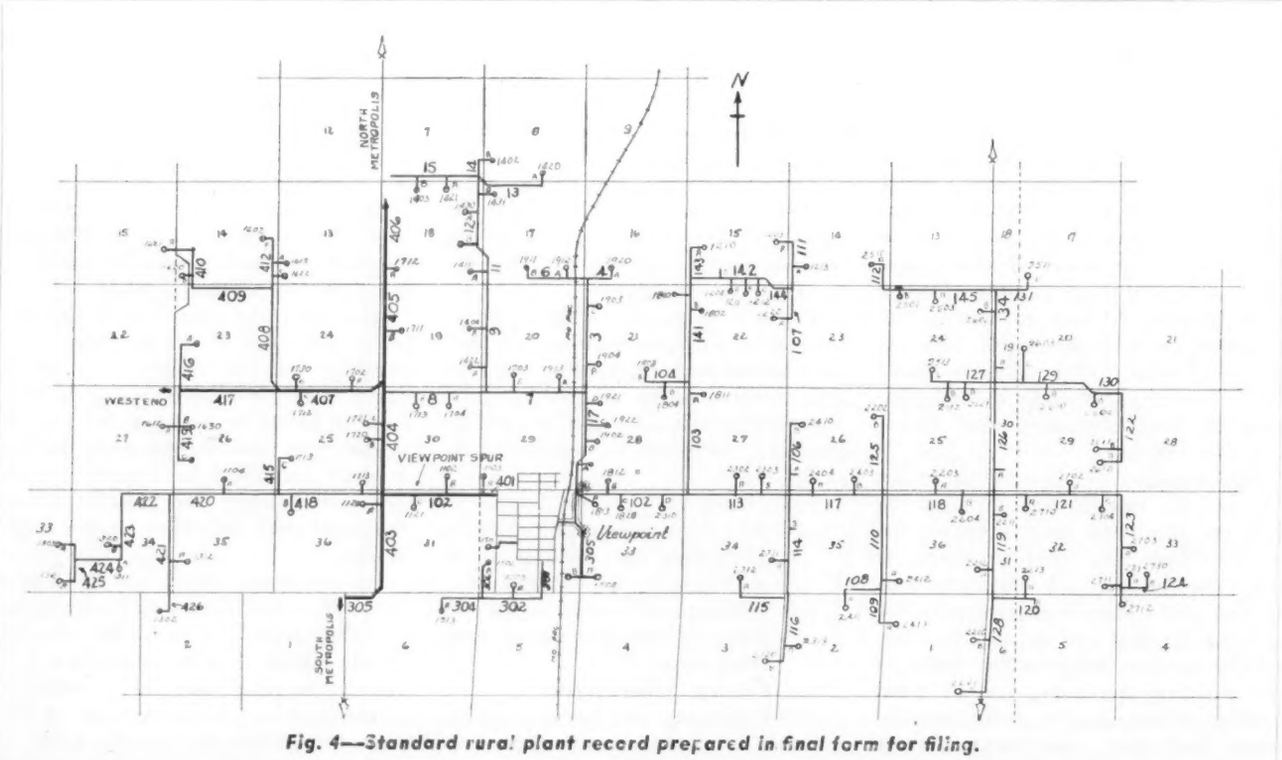
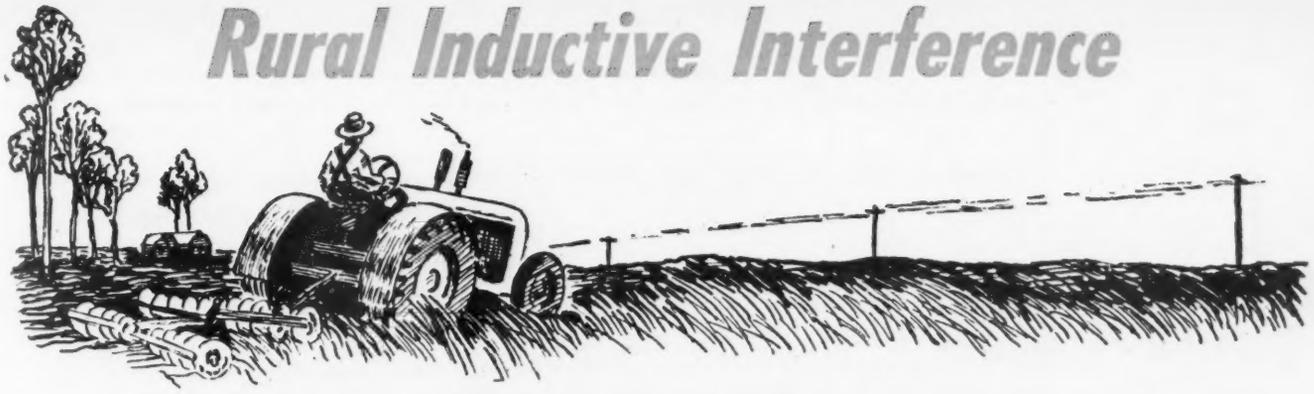


Fig. 4—Standard rural plant record prepared in final form for filing.

Rural Inductive Interference



Diligent effort and a good understanding of corrective measures enables the manager to keep noise levels down to a point where satisfactory service can be maintained.

By B. C. Burden
Telephone Engineer,
Lincoln, Neb.

NOT SO LONG ago inductive problems, in the average exchange, were confined to a few miles of parallel and this usually with power lines of relatively low inductive influence. This same "average exchange" today has virtually 100% of its lines paralleled with rural power lines of *maximum inductive influence.* Not only this but in many cases the low frequency induced voltage to ground on the paralleled telephone lines is so high it is often uncomfortable to handle telephone wires with out using rubber gloves.

The problem of keeping noise and shock hazards within reasonable limits makes it imperative that every exchange manager be thoroughly familiar with methods of minimizing inductive interference. We cannot hope to completely eliminate noise on our longer parallels but by diligent effort and a good understanding of the corrective measures we can keep noise levels down to a point where satisfactory telephone service can be maintained.

This article is intended to review only the most pertinent features of the inductive problem and to suggest remedial practices which have been found economically feasible in their application.

Power Line Transpositions

THE FACT that noise is induced in telephone lines by the electrostatic and electro-magnetic fields (See *Fig.* 1) surrounding the power wires is too well known to require any elaboration here. It is much more timely to discuss the conditions under which the adverse effect of these noise sources can be minimized. Though present day rural power systems (See *Fig.* 2) have relatively high inductive influence, under normal conditions of operation of the power lines and with adequate remedial measures applied to the telephone circuits satisfactory operation of the telephone circuits can be expected.

There are some types of power lines on which transpositions (see *Fig.* 3) will lower the inductive influence of the power parallel and even bring about a partial neutralization of the induced voltage in the paralleling telephone lines. But the major portion of our rural parallels are with two-wire power lines of the multi-grounded type. With this type of line power transpositions are of no value.

For all practical purposes, particularly on rural line parallels we can conclude at the outset that little if any help is to be expected from power line transpositions. Even in the multi-wire main feeder networks which supply the rural single phase branches power transpositions play a minor part in the overall inductive picture.

Where the power line is transposed the power and telephone transpositions should be coordinated for maximum effectiveness. A simple coordinated arrangement of power and telephone transpositions is shown in *Fig.* 4.

If it were possible for our telephone circuits to consist entirely of twisted pair wire, perfectly balanced with respect to both series and shunt resistance, inductance and capacitance effects, and with no unbalances in the subscriber's instrument or in the central office equipment, our noise problem would be nil. It is the departure of practical telephone circuits from this ideal which causes our headaches.

Two wires of an open wire telephone lines are relatively close together, yet this small spacing is sufficient to expose them *unequally* to the paralleling power circuits. Irregularities in the horizontal and vertical spacings between the wires on the two sets of pole lines and variation in slack all tend to aggravate this effect.

Transpositions in the telephone circuits tend to partially restore the electrical balance between the power and telephone circuits by switching the wire positions. The more frequent the transpositions the more effective is this remedial measure.

In the past it has been the practice to place transpositions at 1320 foot intervals. The increased inductive influence of present-day rural power lines is resulting in a shorter spacing between transpositions in the telephone line. Rural Joint use has demonstrated the need for transposing telephone circuits on every other pole.

The Bell System R1 transposition scheme which involves transposing circuits on every other pole and the use of special point type transposition fixtures is receiving more use in rural plant. It provides a much better balance than do the schemes which space transpositions at ¼ mile intervals.

Noise Contributing Factors

THE PROPER approach to any specific noise problem or to overall ex-

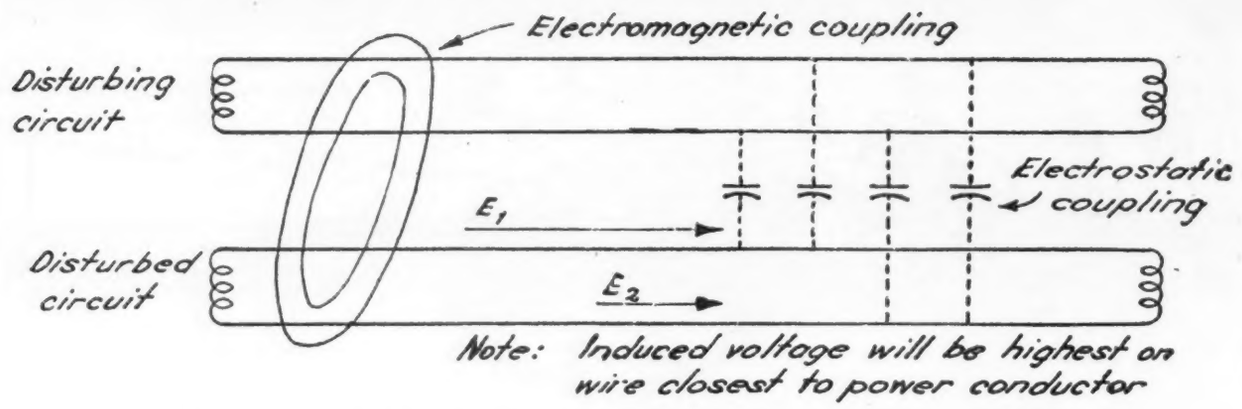


Fig. 1—Inductive effects due to electric and magnetic fields around power conductors.

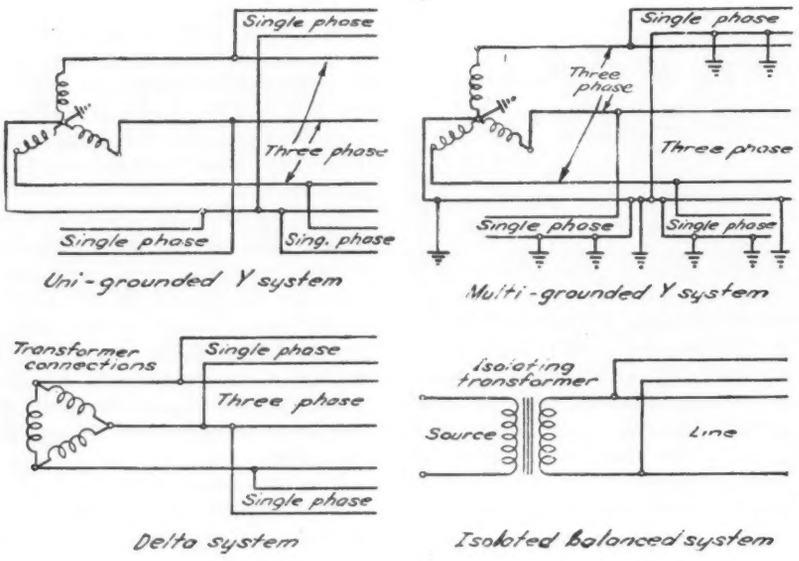


Fig. 2—Common types of power lines.

change noise reduction program is to examine each noisy line with respect to the following factors:

(1)—Leakage of line wires and cable to earth.

(2)—Possible leakage to earth at the subscriber's station or in the C. O.

(3)—Effectiveness of the transposition scheme.

(4)—Series resistance unbalance of the two line wires.

(5)—Possible series unbalance in C. O. equipment.

(6)—Shunt capacitance, unbalances in cable, C. O. equipment or the subscribers set.

A common cause of noise on rural lines is leakage to earth. Leakage to earth, even though the leakage path has high resistance, offers an opportunity for the induced power voltages in the telephone circuit to establish a noise current flow. A small amount of leakage will often nullify the effectiveness of perfect series symmetry, adequate transpositions, and well-balanced central office and subscriber's equipment. Leakage to earth is easy to detect and normally not hard to find and clear.

Where To Find The Trouble

TYPICAL trouble spots for leakage to earth are:

(1)—Dirty arrestor blocks at the subscriber's station.

(2)—Dirty arrestor blocks on the C.O. mainframe.

(3)—Tree leakage.

(4)—Wires off insulators.

(5)—Leakage to ground due to defective jumper wires at cable terminal, corner or buck arm poles.

(6)—Leakage to ground due to carbonized generator shunt springs or carbonized push button spring assembly on rural lines with grounded signalling.

(7)—Defective entrance cable.

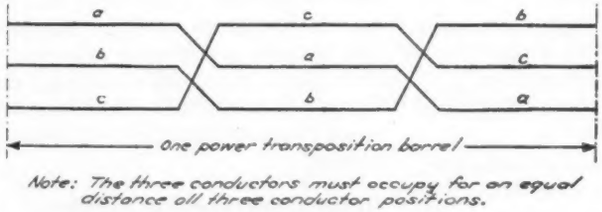


Fig. 3—Transposition on three phase power line.

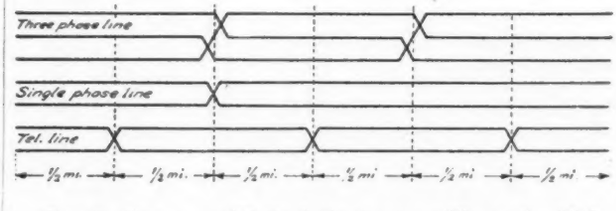


Fig. 4—Power and telephone transpositions should be coordinated.

Fig. 5 shows focal points of leakage trouble.

The importance of keeping rural toll lines free from leakage to ground can be appreciated by recognition of the fact that many rural telephone lines have induced power voltage levels between wires and earth as high as 100 volts. This voltage can set up substantial circulating noise currents in the telephone circuit even though the leakage path may be as high as 500,000 ohms.

Leakage conditions, which in the old days would hardly be noticed, may now cause heavily paralleled rural telephone circuits to become almost uncommercial. It is essential that a continuous program be waged against defective insulation points in plant otherwise a spell of wet weather may noise up lines so bad as to make them almost unusable.

This preventive program will require being constantly on the alert for broken insulators, defective jumpers, dirty arrestors, etc. It should also include occasional overall exchange surveys which should be made both on dry and on wet days. These should consist of insulation resistance measurements of all rural and toll lines made from the wire chief's test panel.

The trouble points on lines which show leakage can best be located by means of a pocket ohmmeter capable of reading leakage resistance up to several megohms. Many of the older types of arrestor blocks and particularly those which have suffered severe discharges are frequent and recurring sources of leakage. It is good economy and a real help in keeping noise levels low to replace such blocks with newer types of the carbon "non-smutting" variety.

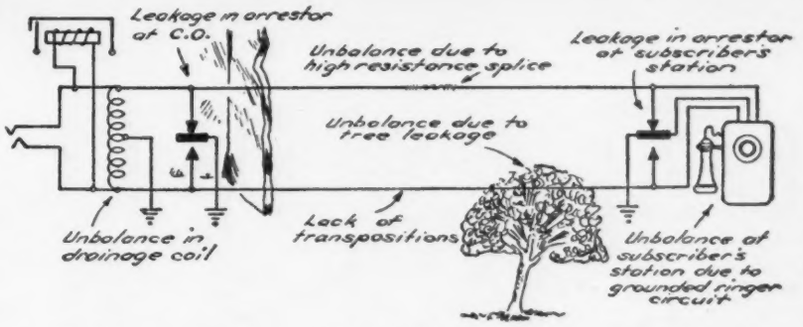

Leakage in arrestor at C.O.
Unbalance due to high resistance splice
Leakage in arrestor at subscribers station
Unbalance due to tree leakage
Unbalance in drainage coil
Lack of transpositions
Unbalance of subscriber's station due to grounded ringer circuit

Fig. 5—Minimum noise necessitates keeping telephone circuits in perfect balance.

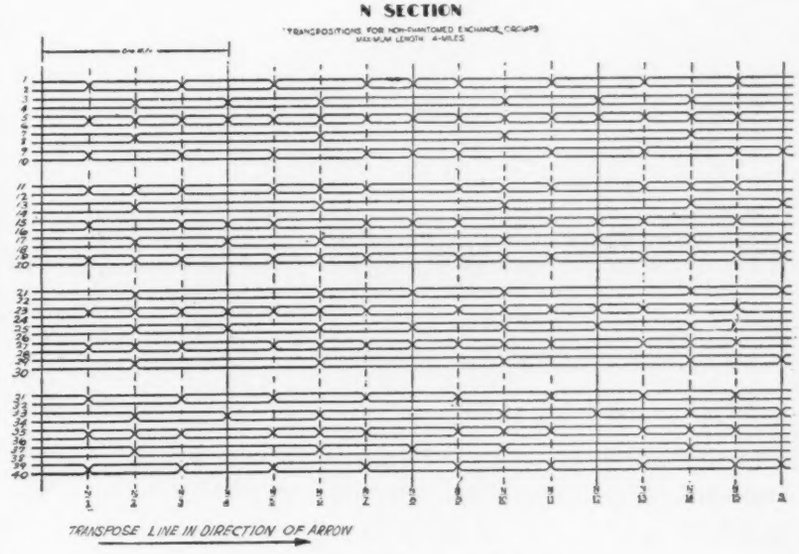


Fig. 6—The Bell System "N" scheme.

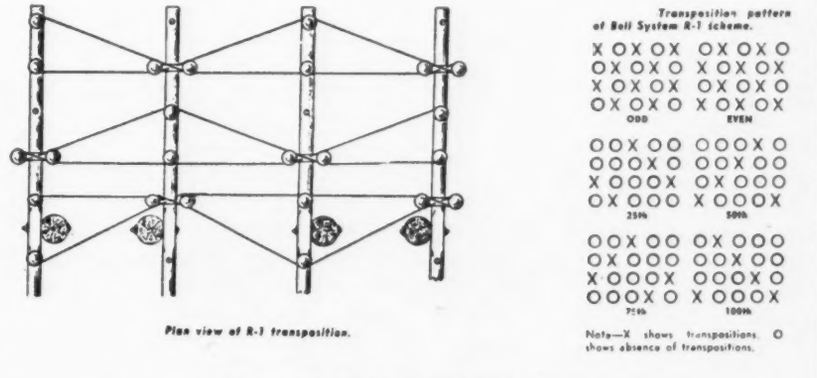


Fig. 7—The Bell System "R" scheme.

The Bell System "N" Transposition Scheme

THE PURPOSE of any telephone transposition is to expose both sides of the telephone circuit in equal amounts to paralleling power lines. This produces an *equalization* of the induced power voltage on the two sides of the telephone circuit. The transposition also serves to balance the line from the standpoint of capacitance and inductive coupling to circuits on the same pole and to earth.

Were it not for the necessity of providing a crosstalk balance to other circuits on the same lead the ideal transposition scheme, though somewhat expensive would be to transpose all circuits on every pole. Because of the crosstalk requirement telephone circuits are usually placed at intervals of not over ¼ mile and in bad exposures, preferably at ⅛ mile or small intervals.

On heavy rural and minor toll circuit leads the N scheme developed and used by the Bell System provides a reasonably good balance of all circuits to any paralleling power lines and fair crosstalk balance within the lead. This scheme is shown in *Fig.* 6.

(*Please turn to page* 66)

Fig. 1—Mounted securely on a trailer and ready to move to a specific location is this four and one-half ton precast concrete manhole for use in the telephone underground plant. It was poured in special forms by Wisconsin Bell plant forces to meet the need for a manhole at a busy intersection.

Money Saving Construction Methods

Lighter, round-ended, "tailored" manhole proves its efficiency. . . . New truck body proves in for maintenance & light duty construction work. . . . Economical way to wipe splices. . . .

By Richard Allen

Contributing Editor,
Telephone Engineer Publications

Manholes 'Tailored' To The Job

SINCE the Spring of 1948, State Division plant forces of the Wisconsin Telephone Co. have been experimenting continuously with the problem of improving the original rectangular precast manholes used in underground work. Now, a lighter, round-ended "tailored" concrete manhole has been designed and has proved more efficient and economical than its predecessor.

How does Plant use precast concrete manholes? This practice developed out of the need to construct new and rebuild old underground manholes in cities and towns. Manholes furnish terminal points for servicing underground exchange and toll cables that fan out from the local central office. By contract, manhole construction work is an expensive, time-consuming job that occasionally ties up a busy street intersection for many days. Seeking a faster and less expensive way of placing manholes, plant men in 1948 began the program of pouring concrete manholes above the ground and then hauling the "packaged" manhole to the job site where it was placed in the hole dug for it below the pavement.

But plant forces were not satisfied fully with these earlier models of precast manholes. Forty-four were molded and placed underground in Wisconsin Bell's State Division in the Spring of 1948. The goal was to reduce the pouring cost of these manholes.

The first step was to replace the rectangular pouring forms with round-ended steel forms that did not require the additional bracing that had to be used on rectangular forms. This helped reduce the cost. To facilitate the removal of the forms and still have a one-piece manhole of reinforced concrete, it further was decided to pour the manhole upside down in two operations.

The roof of the manhole, which has a circumference about an inch greater than the main body of the manhole, is poured first. The roof reinforcing bars, bent at the ends before the pouring, extend about a foot into the manhole's sidewall form which is placed, upside down, on top of the roof. Steel netting is inserted in the sidewall forms and the concrete is poured.

After the sidewalls have set for six hours, the forms are pulled off in one piece by a power winch, resulting in additional savings. The concrete is allowed to harden completely. The finished manhole, a solid reinforced concrete unit, is about six feet high and weighs four and one-half tons, a full ton less than its rectangular forerunner. The floor can be poured either below the walls or just inside the walls. If slots for conduit ducts are desired in the walls of this manhole, special cores are bolted in the proper place to provide for any openings needed in the finished manhole. (*See Figures* 1—5.)

On a typical job at a busy intersection in Neenah, Wis., it was necessary to rebuild the manhole. Using

Fig. 3 — The derrick and unloading frame are erected and the power winch from the line construction truck attached. The manhole first is lifted off the trailer which is then pulled away. Then the manhole is eased down into its permanent underground position, providing a terminal point for the servicing of important toll and exchange cables.

Fig 4—The outside of the steel form in which the concrete round-ended precast manholes are made is shown here locked in position. The handles along the upper half of the form are used in lifting off the mold after the concrete has set for about six hours.

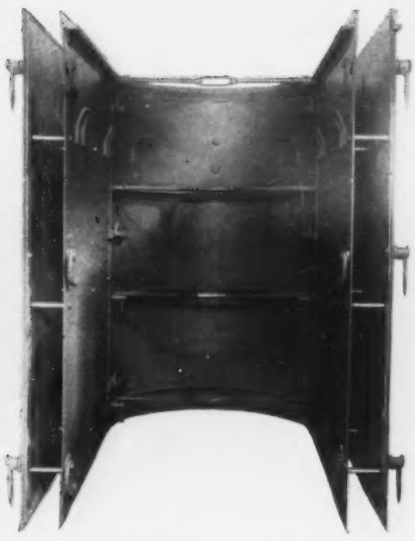


Fig. 5—A cutaway view of the inside and outside metal walls of the precast manhole forms is shown here. To provide openings in the manhole sidewalls for duct runs, special core forms are bolted between the form walls at points where they are required.

the round-ended manhole form together with cores to provide for openings to fit existing duct runs, the "tailored" manhole was poured. At the intersection, a hole below the pavement was prepared to accommodate the manhole. *Figures* 1, 2 *and* 3 illustrate how the precast manhole was loaded on a trailer, taken to the intersection, raised off the trailer by a plant-designed derrick, and then lowered into place, the openings in the manhole walls slipping around the existing cable facilities.

Everything went well on this job and the resulting cost was approximately one-half the average contract price for similar manhole rebuilding jobs in 1948. And the new method is faster. The street was closed to traffic only slightly more than four days, compared with many days under the old system.

Improvements in Light-Duty Truck Body Saves Money

A NEW TRUCK body has recently been developed for use by small as well as large telephone companies, who need a truly versatile type of truck for maintenance and light-duty construction work.

A novel feature of this truck is the provision of a "fold-over" type derrick capable of handling poles up to 35 feet in length. Flexible cables instead of the conventional "stiff leg" are employed. This arrangement enables the quick erection of the derrick, whenever needed, and an equally rapid lowering and storing on the truck when not in use. Time ordinarily spent in handling and assembling the derrick is thus saved. Adjustable safety chains prevent whipping of the derrick, as when a load is suddenly released or dropped. The derrick may be normally carried resting on the heavy-duty rack between the cab, but may be easily removed, if desired. *Figure* 6 shows the truck with the derrick in the raised position.

A 6000-pound capacity winch is mounted beneath the floor with the winch line passing under the floor to the derrick. This feature permits operation of the winch without the necessity for moving the load in the body out of the way. A removable cover gives ready access to the winch for normal inspection and maintenance.

Another interesting feature of this truck is the provision for attaching a 24-foot 2-section extension ladder to the rear tool and ladder rack in such a way that it can be erected and climbed while mounted on the rack, as shown in *Figure* 7. This enables the ladder to be used for working on and around wire or cable leads, as in trimming trees, resplicing wires in a span, or repairing lead-covered cable. There is a safety ad-

Fig. 2—Arriving at the street intersection in Neenah, Wis., the trailer is positioned over the hole dug to accommodate the precast manhole which has slots in its sidewalls "tailored" to fit existing conduit runs. The sections of a special tubular steel derrick also can be seen mounted on the trailer next to the manhole.

Fig. 6—(Left) Light duty construction and maintenance truck with derrick in erected position. (McCabe Powers Body Co.)

Fig. 8—(Above) Truck with ladder and derrick in carrying position. (McCabe Powers Body Co.)

vantage in this feature, in that the ladder can be erected in this way on a busy street with the truck diverting the traffic around the ladder. This will enable cable splicers to work on a cable span over the street without fear that the ladder will be struck by a vehicle, as might happen, were the ladder set up by itself. At the same time, the ladder can be removed from the truck for use away from the car whenever this is necessary.

This new truck has large well-organized compartments with bins; shelves and material hooks. A ribbed steel floor with floor drains is provided, and the top of the compartment sections and the rear bumper and step assembly are covered with safety tread plate. The body measures 84-½ inches long by 48-½ inches wide (inside) and is designed for installation on a ¾-ton truck chassis with a "back of cab to center line of rear axle" dimension of 49 inches. *Figure* 8 shows the truck with the derrick and ladder in position for carrying.

An Economical Way To Wipe Splices

CABLE SPLICERS know that a considerable amount of wiping solder is required to properly wipe a sleeve to cable joint in the standard manner. During the recent war, wiping solder became quite scarce and it was necessary to develop a special wiping method that would save solder. This was done by using only enough solder to form a fillet over the joint instead of the customary bulge intended to add strength to the joint, as shown in *Figure* 9. Such joints were termed "Victory" joints. Since the war, it was found that joints wiped in the economical way stood up well and the method has since become standard with many companies.

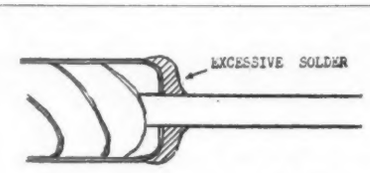


Fig. 9—Old type wiped joint showing excessive use of solder.

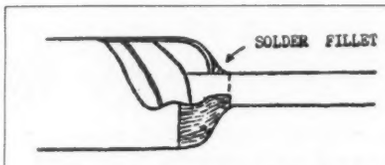


Fig. 10—New type wiped joint saves solder.

In preparing the joints, the ends of the sleeves are well beaten down, so that the ends curve over in tight contact with the cable sheath. The ends of the sleeve and the cable are carefully shaved and worked over with a carding brush to provide a bright surface, which is necessary for successful wiping. Pasters are attached around the cable and sleeve to provide a narrow wiping space about 2-inches wide overall, more or less, with a width on the cable sheath of ¼" to ½", depending on the size of the sleeve.

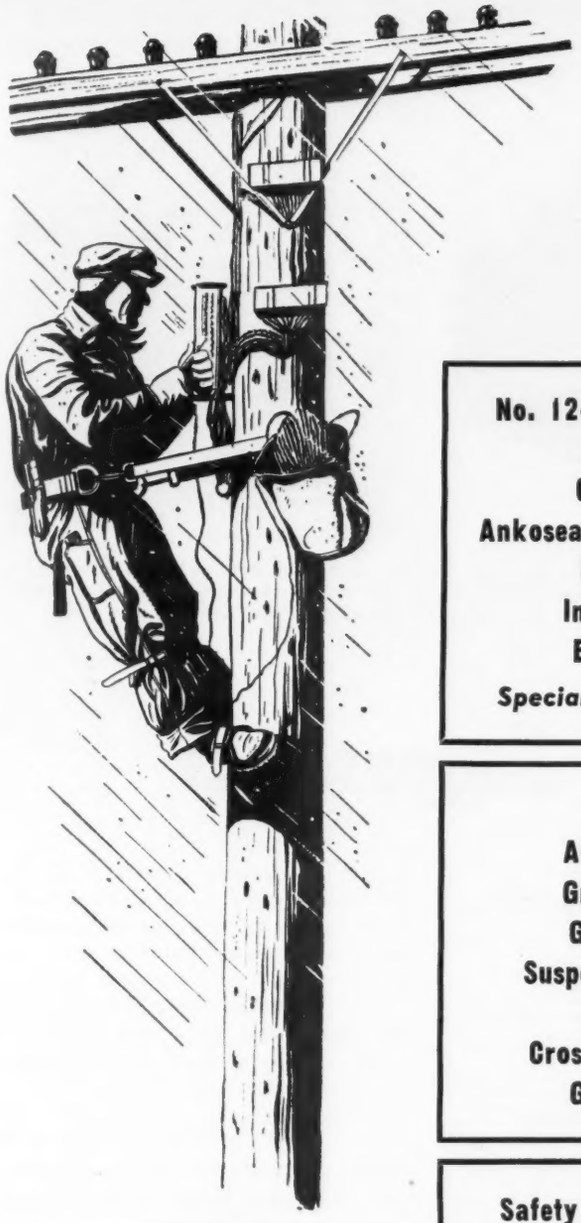
The joint is preheated with the first one or two ladlefuls of solder and then wiped with a wiping cloth in the standard manner, pouring on more solder, as necessary, and spreading it over the joint. When the joint has been shaped in approximately the desired way, the finishing cloth is held with two hands and dragged over and around the joint to remove most of the solder. This leaves a fillet of solder at the point where the sleeve contacts the cable sheath, as indicated in *Figure* 10.

Fig. 7—Truck with extension ladder raised and attached to rear rack for climbing (McCabe Powers Body Co.)

Bands For Repairing Split Crossarm Ends

IT IS A COMMON practice to repair the split end of a crossarm

(*Please turn to page* 55)



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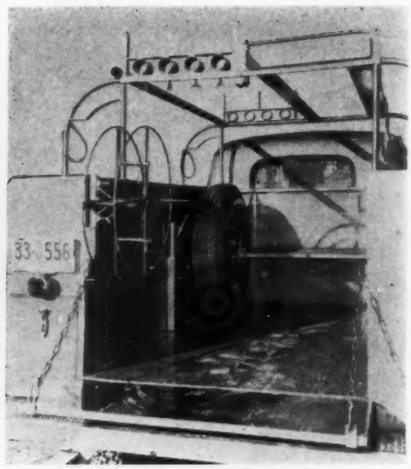


Fig. 1—(left) Light duty construction and maintenance truck, showing reel pin brackets and swinging drop wire reel. . . . Fig. 2 (right) Rear view of light duty truck, showing swing-down seat. Arrow points to auxiliary bracket inside truck for supporting drop wire reel when not in use. Note use of non-slip floor plate on combination bumper and step.

"How To Do It" Suggestions

New Features Added To Light Duty Truck

By John G. Reynolds

Managing Editor,
Telephone Engineer Publications

LIGHT CONSTRUCTION and maintenance trucks of a type intermediate between the standard construction truck and maintenance-installation car have become popular with telephone companies. They enable economical maintenance of open-wire lines and are very useful in extensive drop wire replacement jobs. They are well suited for work involving the extension of open-wire lines and the installation of subsets on the extended lines in rural expansion programs.

To make this type of truck even more versatile, a mid-western company has equipped their light duty trucks with removable reel pin brackets, a swinging drop wire reel, four-foot ladder rack, and swing-down seat for extra men. *Figures* 1 *and* 2 illustrate the use of the foregoing described equipment.

The use of removable reel pin brackets does away with the necessity for providing the truck with a trailer to carry a two-pin reel board in paying out line wires to be raised to poles. These brackets are inserted in channels under the truck bed and are held in place by means of steel pins. The wire reels are mounted on the reel pins on the ends of the brackets. Then as the truck proceeds along the right-of-way, the wire is paid out from the reels. *Figure* 3 gives the details of the bracket construction.

A drop wire reel equipped with a bracket fixture is mounted on a bracket attached to the rear end of the left-hand side compartment as shown in *Figures* 3 *and* 4. The bracket arrangement permits the reel to be swung out in a 90-degree arc and fastened in any desired position within the arc of swing. This enables the drop wire to be fed from the proper angle without the necessity for spotting the truck in an awkward position. When not in use, the reel can be lifted out of the bracket and placed on another similar support inside the truck body. (This support

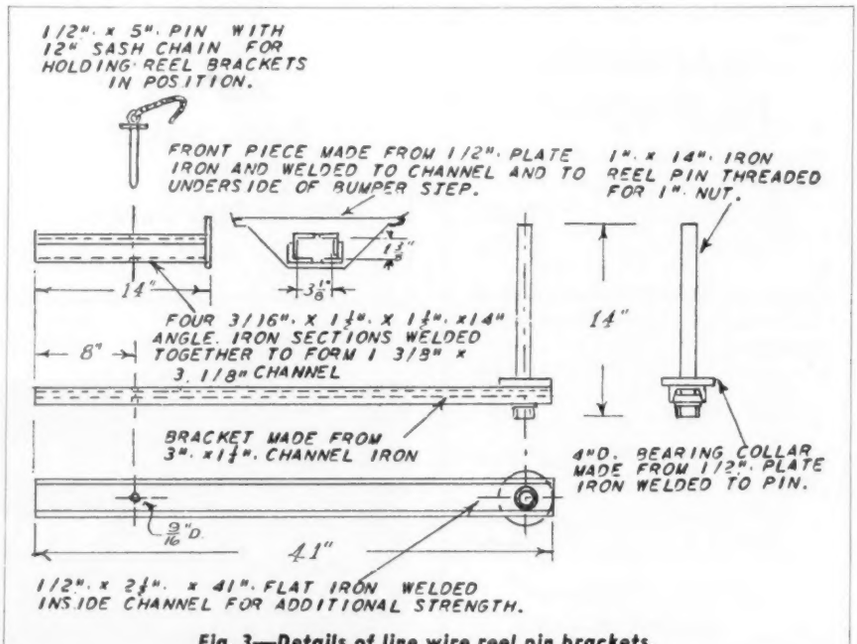

1/2". x 5". PIN WITH 12" SASH CHAIN FOR HOLDING REEL BRACKETS IN POSITION.
FRONT PIECE MADE FROM 1/2". PLATE IRON AND WELDED TO CHANNEL AND TO UNDERSIDE OF BUMPER STEP.
1". x 14". IRON REEL PIN THREADED FOR 1". NUT.
14"
FOUR 3/16". x 1 1/2". x 1 1/2". x 14" ANGLE IRON SECTIONS WELDED TOGETHER TO FORM 1 3/8" x 3. 1/8" CHANNEL
8"
14"
BRACKET MADE FROM 3". x 1 1/2". CHANNEL IRON
4" D. BEARING COLLAR MADE FROM 1/2". PLATE IRON WELDED TO PIN.
41"
1/2". x 2 1/2". x 41". FLAT IRON WELDED INSIDE CHANNEL FOR ADDITIONAL STRENGTH.

Fig. 3—Details of line wire reel pin brackets.

is shown in *Figure* 4.) Dimensions and constructional details of the swing drop reel and bracket are given in *Figure* 4.

Two "J" supports made from 1½" x ¼" strap iron and welded on top of the right-hand side compartment, just to the side of the extension ladder channel on the tool rack, are provided for carrying a four-foot step ladder. The ladder is laid longitudinally in the supports, which are spaced 32" apart, and is strapped in place with canvas straps. The ladder is used principally in station installation work.

Since the light duty truck can carry only three men in the cab, and it is sometimes necessary to carry as many as five men, a swing-down seat is provided in the front part of the compartment body as shown in Figure 2. This is a 1" x 15" x 34" plywood seat supported in the rear by a piano hinge and at the sides by a chain.

Another feature not mentioned previously is a combination bumper and step which is designed to enable workmen to climb aboard or down from the truck with greater ease and safety than in the case of trucks provided with strap type step at the side of the rear end of the truck bed. The combination step is overlaid with C. K. plate to prevent slipping in wet weather.

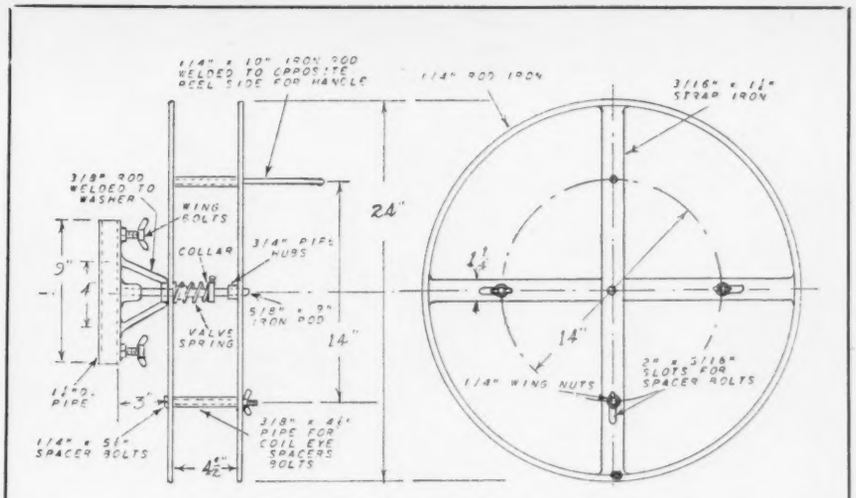


Fig. 4—Details of drop wire reel and bracket fixture.

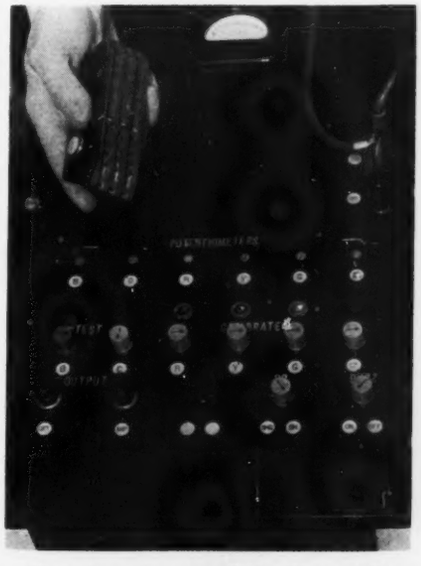
Locating Line Troubles Before They Occur

CATCHING troubles before they affect telephone service—that's the constant goal of plant maintenance forces throughout the country. And now a new method, described in the Wisconsin Telephone News—dry weather insulation checks is being used to find potential trouble makers on telephone lines at many Wisconsin Bell exchanges.

The breakdown of insulation on wires always has been a major source of service failures. Some form of insulation is needed to keep the electrical currents that are vital to voice communication flowing along the wires between the calling and called telephones. Insulation—a non-conductor of electricity—can be any one of many substances, depending on the need. In cables, paper often serves to insulate each wire electrically from those around it. In open wire, air serves to insulate wires from each other. Drop wires from poles to the subscriber's premises have a special heavy compound insulation to protect the wire from trees or any other objects which might short out the circuit.

When insulation begins to break down, there's potential trouble in the telephone system. Moisture might seep into a cable through a crack in the lead sheathing. As the paper insulation gets damper, it becomes a conductor of electricity and the voice-carrying currents leak from wire to wire in the cable, affecting or even breaking off the voice path.

In the past, wet weather insulation checks have been made to find leakage or loss of electrical currents on any specific circuit. However, there was one drawback. The leakage, amplified by the excessive moisture during the rainy weather, would not be detectable by an instrument durind a dry spell. Now, however, plant forces can run tests both in wet and dry weather, the new dry weather insulation test sets filling in a gap in plant preventive maintenance procedure.



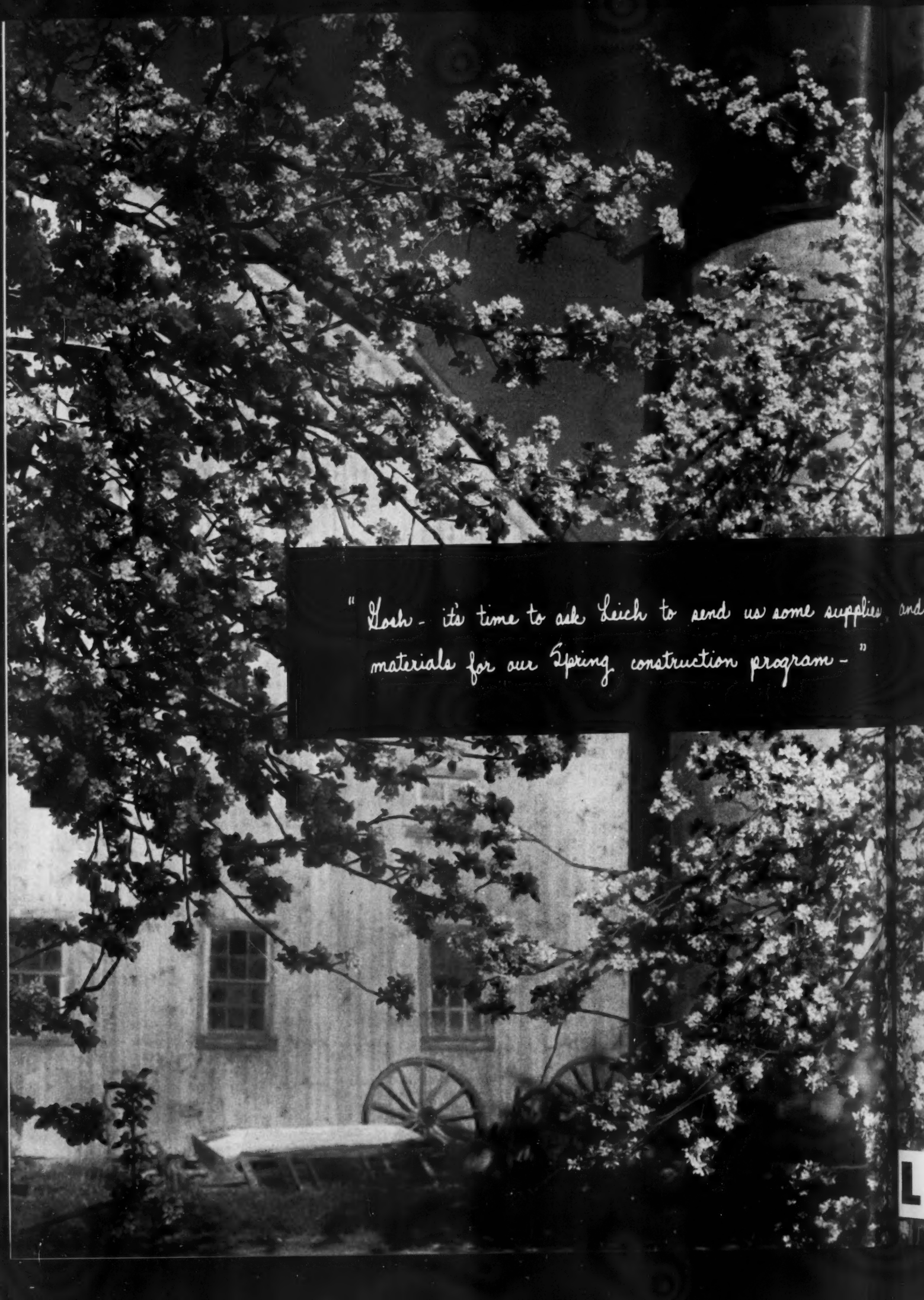
Here is a closeup of the dry weather insulation test set together with the test shoe (in plant man's hand). The latter has three grooves which make it easy to run down a row of terminals when conducting tests. If there is any electrical loss on the line touched by the test shoe, one of the lights above the word "Calibrate" on the test set flashes on. A buzzer also will sound if the "Buzz" switch is on.—(Courtesy Wisconsin Telephone News.)

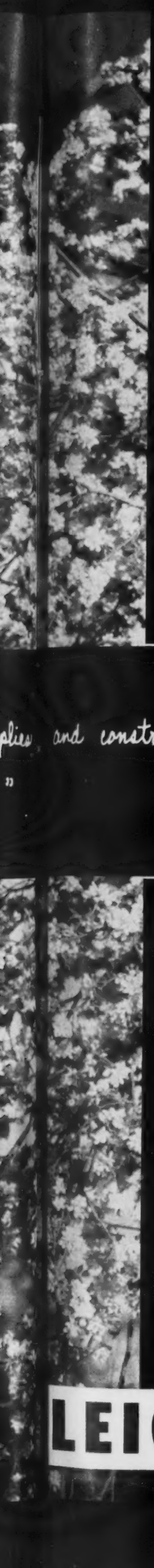
When dry weather tests are made of all circuits at any given exchange, Wisconsin Bell plant men, using a portable test set, check every line at frequent intervals. The tests generally are made during a dry weather period immediately after daybreak when air inside the cable is cooling off. If there are cracks in the cable, the damp outside air is drawn in. With the sensitive dry weather insulation test set, plant men then can determine by a light signal or a buzzer whether there is no leakage, slight leakage, or serious current loss through the insulation at some point along the cable. If the tests indicate defective insulation, immediate action is taken to remedy the situation.

In many cases, there is only a small leakage which hardly affects the talking circuit. But it's a potential trouble that suddenly might cut off service completely to one or more subscribers. So plant forces bring about an "actual breakdown" at the weak point so it can be located quickly and repaired.

Here, briefly, is what is done. A cable terminal point near the approximate location of the weak point is opened and a special breakdown test set connected to the faulty line. A voltage is applied which taxes the strength of the insulation. At the point where the insulation is defective, the voltage causes a complete breakdown, putting the line temporarily in trouble. The plant man then

(Please turn to page 64)


"Gosh - it's time to ask Leich to send us some supplies and
materials for our Spring construction program - "



plies and construction

Your job in the spring is to get your outside plant in tip-top shape. Our job is to help you by furnishing the materials and tools and things you need. We count it our job, also, to see that you get the very best available — that you get it where and when you want it—and with the least fuss and bother and worry on your part.

Here at Leich you can count on receiving materials that are proved-on-the-job by hundreds of telephone companies. Here too, you will find a friendly, helpful, courteous service that will make your jobs go more smoothly.

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LEICH

MANUFACTURERS OF TELEPHONES, SWITCHBOARDS AND RELATED APPARATUS SINCE 1907

Small Company Talk

By Bill Corman

BILL ADVISES—"Don't forget your peg count . . . It's a useful procedure that will eliminate a lot of guess work . . ."

HI, NEIGHBOR! In the last article of SMALL COMPANY TALK, we discussed the taking of a peg count. In this one, let us talk for a while, about the uses to which this study can be put.

You will remember that we finished with a table for each day, giving us a total work load, stated in terms of local calls, for each period of each day. I find that putting this information in graph form helps me to see it more clearly. The first job, however, is to combine the daily sheets into an average. This is accomplished by the use of a simple form such as that shown in *Exhibit* 1. The first column of figures on this Exhibit is copied from the sheet shown as an exhibit in the last article, and the next daily columns are copied from similar daily sheets that were assumed to have been prepared for the other days during which the peg count was being kept. The averages derived from Exhibit 1 are then plotted on a simple graph like that in Exhibit 2. I find it wise to plot two curves: one for the average week day, and the other for Sunday information. For the sake of simplicity, however, only the average week day figures are shown on the graph as the solid curved line.

Now comes the question of using this graph. The first job is to determine the number of operators required during each hour of the day. This involves answering the question: How many work-load-equivalent local calls can the average operator handle in an hour, and still be able to give good service and not be overworked? This, Neighbor, is a hard question, and after I give my answers to it, I am going to duck and run, for my figures are definitely open to question. For the Magneto Computation (which the exhibits are based on) I use a figure of 150 local calls an hour, and for Common Battery, 200 or slightly over. Here again, however, you must use your common sense. If, by using these figures, you determine that, for example, you need 2 operators from 2 to 3 P.M., and you find by actual experience that your two operators can't handle the board properly, then you need to reduce the operator work load to 125 for Magneto and 150 for Common Battery, or some other reasonable figures. The 150 and 200 figures are for good, alert, experienced operators; new, slow or lazy operators can't handle that much of a load. Operators have been known to handle up to 500 calls an hour on a "Feature" Common Battery Board—we had one that completed just under 200 in a half hour period, but that was fast operation, and few operators could keep it up for any extended length of time.

Blank Telephone Company Peg Count Summary Sheet

Feb. 6 - 11, 1950

	Total traffic load from daily peg count sheets							
Hour	Mon	Tue	Wed	Thur	Fri	Sat	Total	Average
11-7	80	30	22	17	75	91	315	52*
7-8 AM	120	102	136	145	92	141	736	123
8-9	380	391	382	361	407	373	2296	383
9-10	540	497	582	460	620	576	3275	546
10-11	490	418	418	432	541	531	2830	472
11-12	400	356	441	456	403	361	2417	403
12-1 PM	360	356	383	371	352	301	2123	354
1-2	385	289	369	389	300	385	2117	353
2-3	295	271	286	318	307	292	1769	295
3-4	282	296	301	284	274	261	1698	283
4-5	300	350	307	289	269	256	1771	295
5-6	487	428	506	475	502	491	2889	482
6-7	380	362	377	384	395	402	2300	383
7-8	221	242	175	185	216	210	1249	208
8-9	202	180	219	226	207	192	1226	204
9-10	120	123	137	100	142	112	734	122
10-11	94	60	87	126	111	92	570	95
Totals	5136	4751	5128	5018	5213	5069	30315	5053

* This figure must be divided by 8 (hours) in order to have a figure that is comparable to the other average figures in this column.

EXHIBIT 1

But using our average of 150 local calls per hour as a basis, we can then take the graph and compute the number of operators required during each hour of the day. I believe that the 150 figure should be qualified in one respect, however. 150 is an average, where, say 3 operators are on duty, and therefore, when three operators are on duty at one time, they should be able to handle up to 450 calls in any given hour. One operator, however, should be expected to handle only say 125 calls, two could handle 275, and three, 450. The explanation for such figures is tied up in rather complicated statistics and the fact that telephone traffic is characterized by "Peaks and Valleys" rather than a steady flow of calls, and the lower the average hourly call figure is, the higher is likely to be the percentage of the peak and valley range or deviation from this average.

On the graph, this fact is taken into consideration, by the use of dotted horizontal lines across the graph indicated as "1 operator work load", "2 operator work load", etc. Likewise, with Common Battery operation, and a work load figure of 200 local calls, the first operator (on duty by herself) should not be expected to carry a load of 200 calls. The first operator should be limited at about 170, two at 370, and three at 600. Again, you may be able to arrive at better figures for your own company by observation of how these work out in practice.

As discussed slightly in the previous article, your peg count, totaled by days, can also be used to determine whether or not you need more operating hours on some particular days than you do on others. A one week count will not usually suffice to determine this, however, unless the figures shown by the count are backed up by real and good reasons showing that the figures are representative. Small differences between days can be discounted entirely as due purely to chance; large differences between days can be studied to see whether they mean anything more than chance.

So far, we have talked about only one use to which the peg count may be put. There are many others. One is using the count to determine how many positions of switchboard is needed to carry the traffic. This problem is tackled from a slightly different angle than the determination of operating hours, in that it deals primarily with "peak loads" rather than average loads. For the number of positions must be sufficient to handle the peaks, even if it means that one or more positions are used only for 1 or 2 or 3 hours out of each 24. Out of your peg count should be picked the peak hour, that is the hour during which the heaviest load was handled, and the day during which the heaviest load was handled. (The heavy hour may or may not have occurred on the heavy day.) Whatever operator load you have been using (in our example, 150) should be divided into the peak hour. If the answer is 2.6, it means that you need 3 positions; if it is 3.2, it means that you need 4 positions, etc.

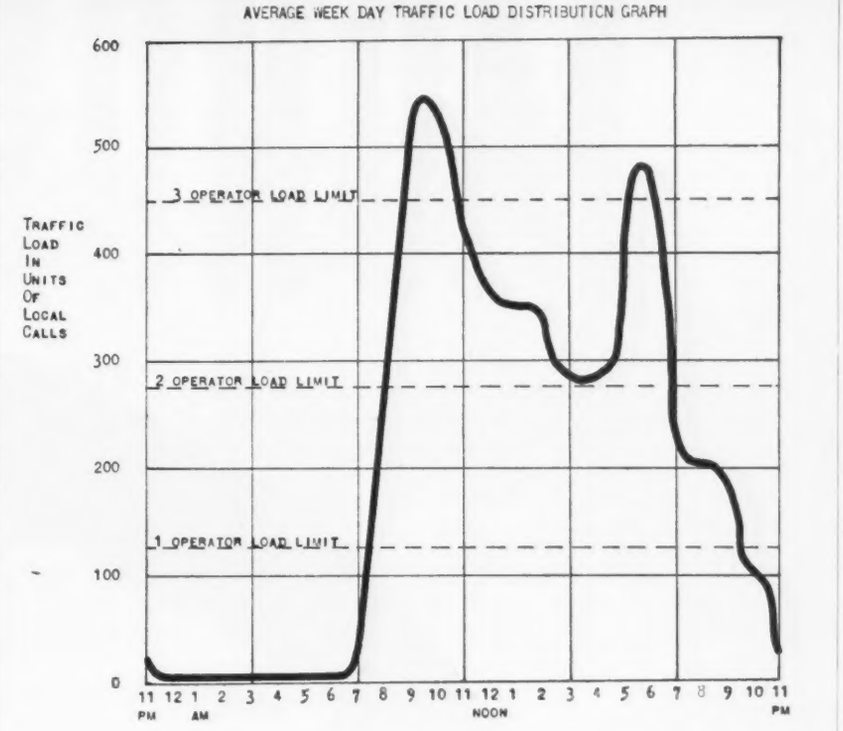

AVERAGE WEEK DAY TRAFFIC LOAD DISTRIBUTION GRAPH
600
500
400
300
200
100
0
3 OPERATOR LOAD LIMIT
2 OPERATOR LOAD LIMIT
1 OPERATOR LOAD LIMIT
TRAFFIC LOAD IN UNITS OF LOCAL CALLS
11 12 1 2 3 4 5 6 7 8 9 10 11 12 1 2 3 4 5 6 7 8 9 10 11
PM AM NOON PM
OPERATORS REQUIRED ACCORDING TO GRAPH:
FROM 11 PM TO 7:30 AM -- 1 OPERATOR
FROM 7:30 TO 8:00 AM -- 2 OPERATORS
FROM 8:00 TO 8:30 AM -- 3 OPERATORS
FROM 8:30 TO 10:30 AM -- 4 OPERATORS
FROM 10:30 AM TO 7:00 PM -- 3 OPERATORS (THE 5 TO 6 PM PEAK MAY REQUIRE ONE ADDITIONAL OPERATOR FOR THAT HOUR)
FROM 7:00 TO 9:30 PM -- 2 OPERATORS
FROM 9:30 TO 11:00 PM -- 1 OPERATOR

EXHIBIT TWO

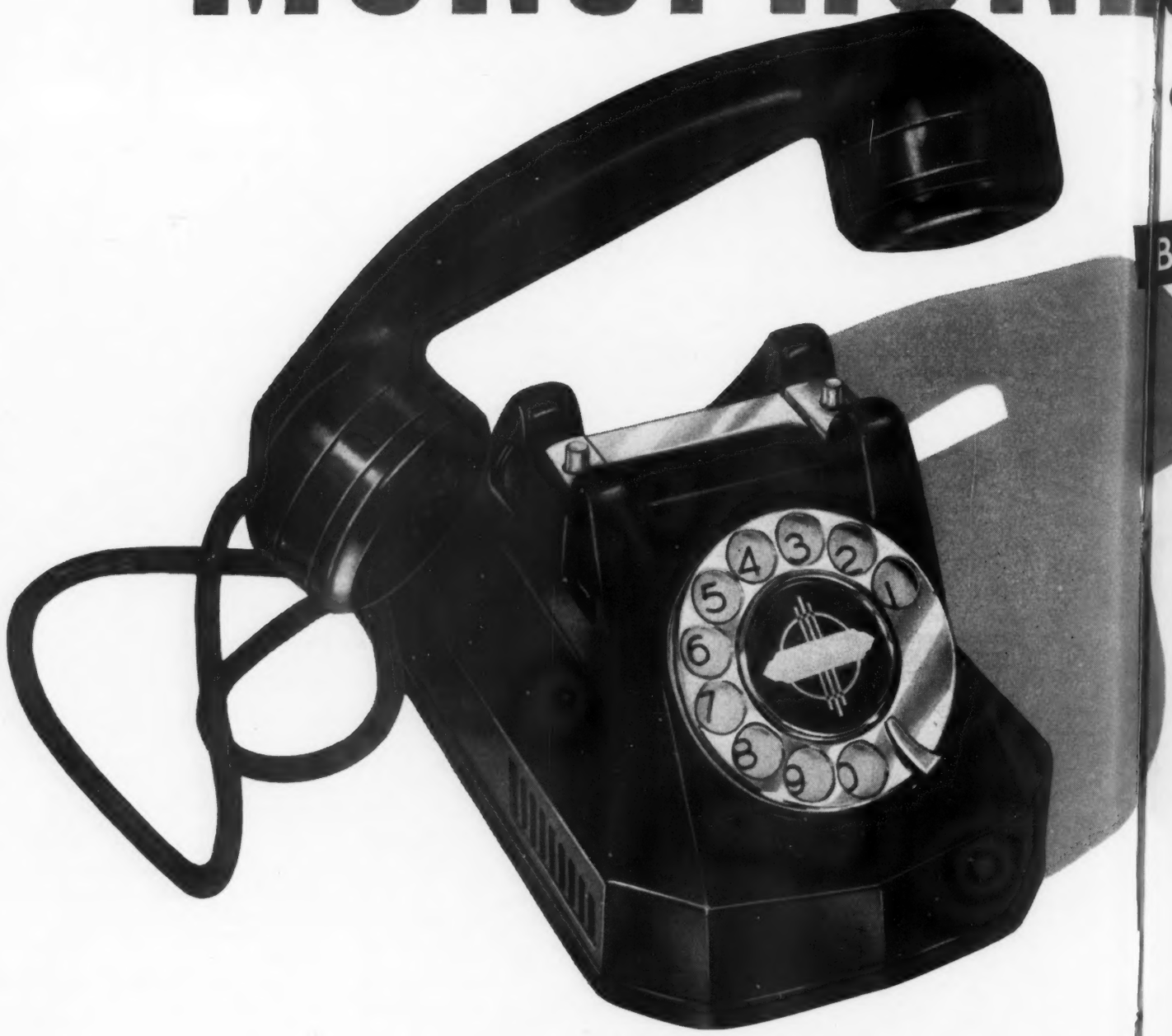
Then take the peak day figure and divide it by 10. Take this result and divide it by the operator load you are using (again, in our own examples, 150). If this result is higher than the result obtained by using the peak hour, then, this last result is the one that should guide; if it is lower, then the first result should guide. In other words, the higher of the two figures should be used. From *Exhibit* 1, we see that the peak hour was from 9 to 10 A.M. on Friday. The peak day was Friday. Dividing the peak hour figure of 620 by 150, we get a requirement of 4.1 positions. Dividing the peak day figure of 5213 by 10, and that result by 150, we get a requirement of 3.5 positions. The indication is, therefore, that at least 4, and probably 5 positions are needed, and a change from the three magneto position board is definitely needed.

There may be other managerial considerations that will affect your decision as to the number of positions you have, such as, you may feel that one is required as a training position, or it may be more economical to add two or more positions at a time to provide for future growth, rather than add one now and another 6 or 9 months from now.

Another use to which the peg count can be put is to check up on your operators. There are a number of ways of doing this. Compare your

(*Please turn to page* 46)

MONOPHONES



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Originators and Developers of the Strowger Step-by-Step "Director" for Register-Sender-Translator Operation . . . Machine Switching Automatic Dial Systems

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BETTER TRANSMISSION . . .

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CHROMIUM-PLATED LIFT BAR

When you use Monophones, you get all four of the important benefits that make these the world's finest, most dependable telephones:

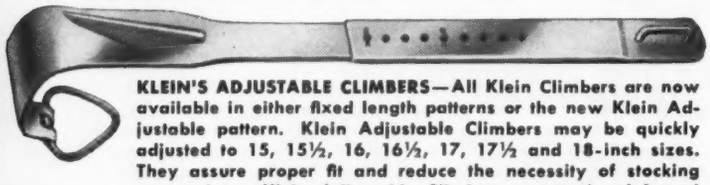
1. You give your subscribers the benefit of the fine transmission provided by Automatic's all-positions transmitter, capsule receiver, and famous anti-sidetone circuit.
2. Your maintenance costs hit bottom—because Monophone parts are engineered to withstand wear, and "shock-proofed" against damage.
3. You get Automatic's famous "quieted-pawl" dial, which in accelerated laboratory tests has averaged more than 184 years of service!
4. You get the new chromium-plated lift bar, either as standard equipment with new Type 40 Monophones or available separately for installation on Type 40's already in service.

Once you install Monophones you'll know why so many Independent telephone companies always use Monophones. MONOPHONES GIVE YOU MORE of the features you need!

new additions to the KLEIN LINE

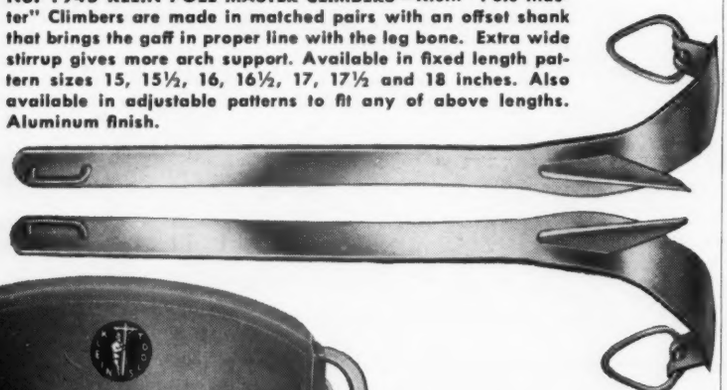
Mathias Klein & Sons continues to offer the electrical industry the most complete line of pliers and equipment on the market. Below are three additions to the Klein Line that have found favor with many utility companies. If you have not had complete information on this equipment, write for details.

Since 1857



KLEIN'S ADJUSTABLE CLIMBERS—All Klein Climbers are now available in either fixed length patterns or the new Klein Adjustable pattern. Klein Adjustable Climbers may be quickly adjusted to 15, 15½, 16, 16½, 17, 17½ and 18-inch sizes. They assure proper fit and reduce the necessity of stocking many sizes. Klein Adjustable Climbers are made of forged steel, individually tempered and tested. Aluminum finish.

No. 1945 KLEIN POLE MASTER CLIMBERS—Klein "Pole Master" Climbers are made in matched pairs with an offset shank that brings the gaff in proper line with the leg bone. Extra wide stirrup gives more arch support. Available in fixed length pattern sizes 15, 15½, 16, 16½, 17, 17½ and 18 inches. Also available in adjustable patterns to fit any of above lengths. Aluminum finish.



No. 5249 "KLEIN-LINE" TOOL BELT—This new belt is designed with a full-floating sliding trace of famous "Klein-Kord." Trace slides through alloy steel guides, allowing approximately 6 in. free movement. Chafing is avoided, and undue wear on safety strap is prevented. Apron design permits visual inspection of trace throughout its entire length.

A soft, pliable latigo leather cushion 4¾ inches wide is pad-lined and edge rolled for comfort. The 2-inch wide belt shape is of heavy harness leather with a drop forged buckle. Made in following sizes: 36, 38, 40, 42, 44 and 46 inches.

Ask Your Supplier
Foreign Distributor: International Standard Electric Corp., New York

The New Klein Catalog giving full information on the complete Klein line will be sent on request.

Mathias KLEIN & Sons
Established 1857 — Chicago, Ill., U.S.A.
3200 BELMONT AVENUE, CHICAGO 18, ILLINOIS

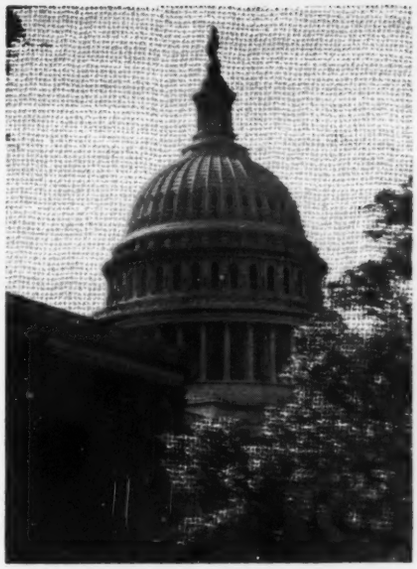
results with other companies and see if, with comparable equipment, your operators can handle as many calls an hour as operators in neighboring exchanges. Another helpful figure in this connection is to determine the number of local calls (actual local calls, no tickets) per station per day that is placed over your board, and to compare this with surrounding companies.

If you find that your operators are doing better than surrounding companies, find out why, so that you will not do anything later or institute any changes in policy that would adversely affect this condition. If your operators are doing worse, dig in again to find out why so that the condition can be corrected. Maybe they aren't trained properly. Maybe they haven't kept up to date on the latest operating techniques. Maybe they are doing unnecessary work, by talking too much, writing too much, or going through unnecessary motions or practices.

If you find that your per station calling rate is high, its a good indication that you are giving good service. If it is low, it may be that there are some reasons for it, such as slow answers, discourteous operating, bad cables, noisy lines, etc., which are discouraging your subscribers —and remember that if they are discouraged on local service, they are doubly discouraged on long distance.

There are other uses to which peg counts can be put; in fact the list is almost endless. You will discover a number of these as you gradually develop your peg count procedures. There is one more, however, that I feel should be discussed a little. It concerns this matter of buying new equipment, of converting from say Magneto to Dial, or to Common Battery. It is an almost infallable rule that when you convert to a higher grade of service, your calling rate will go up. Thus, when considering a new switchboard, you can take your present call rate per station, increase it sufficiently to take care of the higher rate that will result from the new service, multiply it by the number of stations you expect to develop in the forseeable future, and arrive at a daily traffic load. Your manufacturer can take this figure and determine the size and specifications of your new board. The size that this load is expected to be, within the predictable future, is basic to many things that the manufacturer must know if he is to serve you best. Battery capacity, Charger capacity, Ultimate board capacity, etc., if figured correctly at the beginning. will save you much

(*Please turn to page* 62)



It Is Your Government

By Robert L. Johnson

President, Temple University and Chairman, "Citizens' Committee For The Hoover Report."

IF YOU FEEL concerned, as who does not in these days, over the vast increase in the cost of your government, and wonder about the reasons for it, you don't have to look beyond the U. S. Post Office for an object lesson in antiquated management, costly methods, and obsolete equipment.

As one of the world's biggest business enterprises with an overturn of $1.3 billions a year, it is the world's outstanding example of how business should not be conducted.

Naturally no private business could be so run that it showed an annual deficit. This year, the Post Office will go "in the red" for about half a billion dollars. This is one-sixth of the staggering sum of $3 billions which, according to the Report of the Hoover Commission, our government is wasting every year.

Nor could any private business survive if most of its key management men were changed periodically with changing political fortunes. And certainly no enterprise could succeed in this day of modern business equipment which adhered, as the Post Office does, to obsolete and crippling methods of work by hand in the sorting, stamping, checking and otherwise keeping track of 37 billion pieces of mail each year.

This condition of the Post Office is nothing new. It has been going on for a century or more. In fact there has been no basic change in its organizational structure since 1836.

The first recorded instance of anybody criticizing the management and methods was in 1889 when John Wanamaker, the Philadelphia merchant, was made Postmaster General. After looking over his Department, Mr. Wanamaker went to President Benjamin Harrison with a revolutionary proposal. He told the President that he would contract to take over the Post Office as a private venture, put it under strict business rules of management, and show a profit to govenrment as well as to himself.

This offer was not accepted but it is notable that 60 years later the bi-partisan Hoover Commission, which was unanimously created by Congress to investigate government spending and waste, after a year's investigation of various departments, made a similar suggestion. It was that application of business principles to the Post Office would save hundreds of millions of dollars. It could save $140 millions at once, the Commission pointed out, by modernizing the organization, methods and equipment. An additional $114 millions could be saved by fixing new rates on certain items.

The Post Office employees are doing a good job under adverse conditions. They are operating a huge business.

It's revenues are $1.3 billions a year. It employs 500,000 people. It operates 42,000 branches and maintains 24,000 buildings. It has a fleet of 10,000 vehicles, of which the average age is 15½ years. It transports and delivers 37 billion pieces of mail each year and conducts 800 million other transactions in money orders, etc. And it runs a savings "bank" with 4 million depositors with total accounts of $3.4 billions.

That certainly looks like good business. But here is the other side of the picture.

The Post Office sells you, and delivers for one cent, a postal card which costs it two and one half cents to print and deliver. This loss in a year amounts to $45 millions. It carries 1.6 billion pieces of mail free. It pays huge subsidies to large users of mail and to airplane, steamship and other carriers. It has no control over its own accounting and cannot tell you what its financial condition is within eight months of date.

Moreover, because of its outmoded methods of work, and meagre opportunities for advancement, it has a tremendous turnover of personnel. Its control is so centralized in Washington that its 42,000 postmasters have little to say about the conduct of their branches and none about their finances. Postmasters are politically appointed.

The Hoover Commission suggested drastic changes to improve these conditions. First, it would take the Department out of politics. It would have postmasters appointed from the service on merit, simplify the 900-page book of regulations which is their guide, do away with hidden subsidies, and adjust the rates to meet the expenses.

There are three bills now before Congress to effect these changes. They are next in order on the Congressional calendar. It is time for you, if you are anxious to see these improvements, to write to your Senators and Congressmen and urge their support of these bills. It will mean money in your pocket.

The Citizens Committee for the Hoover Report, a nonpartisan, voluntary group nation-wide in scope, was organized to carry on an educational campaign following the expiration of the Hoover Commission on June 12. It was suggested by President Truman in order that the work of the Commission might be kept before the public during the progress of the Reorganization bills through Congress.

The directorate of the committee indicates its nonpartisan nature. On the board are leaders in agriculture, business, education, labor, and veterans and women's groups without regard to party or other affiliations.

—(*Part III of this series will appear in the May*, 1950, *issue of* TELEPHONE ENGINEER & MANAGEMENT. *Part I was published in the March*, 1950 *issue of* TELEPHONE ENGINEER & MANAGEMENT.)

Conrad Ryan Purchases Inkster, N. D., Company

Announcement has been made that the Inkster (N. D.) Telephone Company has recently been sold by the former owner Robert Syvertson, to Mr. and Mrs. Conrad Ryan, who have assumed management of the business.

a plan for TODAY

and TOMORROW!

The Bell System Companies' Benefit and Pension Plan does more than help provide for retirement. It also provides for emergencies that may occur during a telephone worker's career —Disability, Sickness, Accident, Death.

The advertisement on the opposite page, describing this well-rounded, soundly financed plan, appears in national magazines during April. It points out that such a program benefits not only the employees—but the public as well.

An advertisement of the

BELL TELEPHONE SYSTEM

"Their Pension Checks Come Regularly"

For more than 37 years, the working days and the future of Bell Telephone employees have been made more secure by a complete Benefit and Pension Plan. The Company pays the cost.

Long ago – before there was any thought of social security or of pensions by most companies – the Bell System Companies started a Benefit and Pension Plan for their employees.

The Plan is much more than a pension plan. It is a well-rounded, financially sound program to assist employees in meeting the emergencies of Sickness, Accident, Disability, and Death, as well as retirement.

It is designed to give help of different kinds and on different occasions when Bell System men and women – the younger as well as the older – may have need of it.

Plan Recently Improved – Important improvements have been made from time to time to meet changing conditions. Twice in the last four years the minimum pensions have been increased. Just last November the minimum pension was raised to $100 a month (including social security) at age 65 for employees with twenty years' service. Many employees get pensions of substantially more than $100 a month.

Benefits Public as Well as Employees – All of this is in the interest of the public as well as telephone employees. Because, for you to have good service, the Telephone Company must have good people to give it to you.

This Benefit and Pension Plan is part of the Bell Telephone Companies' responsibility as good employers and good citizens in every community in which they operate.

BELL TELEPHONE SYSTEM

REA Makes Telephone Loan to New York Company

The Rural Electrification Administration has allocated $95,000 for a load to the Pattersonville Telephone Company Rotterdam Junction, N. Y., for improvement of service to its 438 telephone subscribers and extension of service to over 100 applicants waiting to be connected, the U. S. Department of Agriculture announced March 24.

The loan will be used to modernize the company's system and to build 7¼ miles of new line. In addition to the applicants who will get service immediately, the new system will be planned to accommodate another 200 subscribers, expected to request service within the next few years, as a result of construction of new homes that is already under way. This will mean full coverage of the company's service area.

Schenectady is the main trading center of the area, and many of the rural residents are employed there. The Pattersonville company has reached an agreement with the New York Telephone Company which, if approved by the New York State Public Service Commission, will remove the present toll charge for calls from Rotterdam Junction to Schenectady.

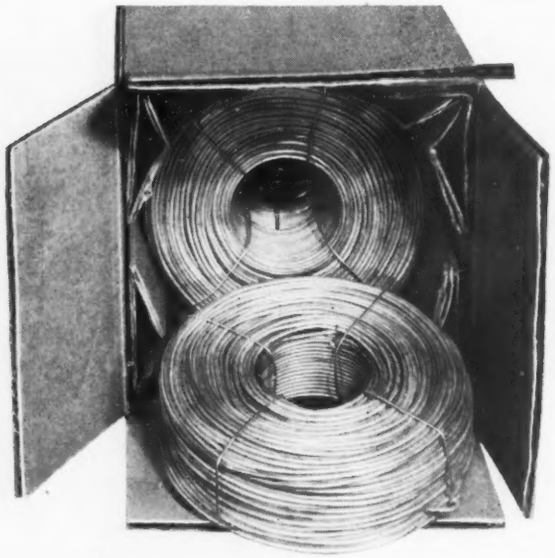
The system has been handling about 3,000 calls a day, which is above its capacity to handle adequately. After enlargement and improvement, the system will have ample capacity to care for the expected increase in traffic.

As security for the loan a first mortgage will be taken on all assets of the company.

The company, established in 1900, operates 42 miles of line in Schenectady County, New York. It serves the unincorporated villages of Rotterdam Junction, Pattersonville and Hoffman in a fertile agricultural area just west of Schenectady.

Indiana Company Plans County-Wide Service

Edward Purtzer, manager of the Southern Indiana Rural Electric Administration, met with representatives of the St. Mark's Telephone Co., Tell City, Ind., the Rev. Eugene



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Cuts Maintenance Costs-**

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Weidman, Norbert Peters, and Bill Beach, county agricultural agent, recently to discuss the possibility of extending the present rural telephone company to cover the entire county.

Mr. Purtzer pointed out that the first step toward such a project would be a survey of prospective customers. These potential customers will be asked to pay a nominal fee for membership in the company plus an equity to guarantee a government loan.

Mr. Purtzer said the deciding factor toward an extension of the present company, would be the number of rural families signing for membership. The government provides loans for such improvements providing the survey proves in advance that such a company could be operated profitably in order to repay the loan to the government and eventually the members of the company would be sole owners.

The Rev. Weidman and Mr. Peters are going forward with plans for the survey for Perry county in order that the company might have information at hand to present should they desire to expand and request a government loan.

REA Co-op Manager Gives Facts To Rural Group

George Holman of Beyer, Mo., was elected temporary president of the proposed Rural Telephone Cooperative at a meeting attended by more than 500 interested farmers at Macon, Mo. C. K. Billiter, of Bynumville, Mo., was named vice president, R. E. Cattey, of Winigan, Mo., secretary, and Virgil B. Vandiver, of Leonard, Mo., treasurer.

Temporary directors and incorporators named besides the temporary officers were: S. O. Embree, Evansville; J. Sam Harlan, College Mound; Paul Crist, New Boston; Earl A. Baer, Salisbury; Frank Watkins, Atlanta; Al Rathjen, Clarence and Clyde Brown, Shelbina. R. Wilson Barrow, of Macon, was named temporary attorney.

These temporary officers are instructed to go ahead with the work necessary to organizing a rural telephone cooperative.

W. E. Adams, manager of the Macon Rural Electric Cooperative, discussed the problems of organizing and operating a rural telephone cooperative. Mr. Adams stressed that "it will be necessary to have a large number of subscribers to make the organization successful."

"If it is the will of you people to organize your own telephone cooperative," he said, "that is your privilege. You should have this information before you enter into it though. First of all, set up an organization that is separate from your cooperative. You can't have an electric-telephone cooperative. They must be separate. It must be set up on a firm footing. A foundation based on sound principles, not here today and gone tomorrow. It must be set up so it is financially sound . . .

"We must organize an organization large enough so as to be able to keep trained personnel to properly maintain that type of equipment. We musn't go half-way on the deal. It is technical and takes training to maintain it. That would be a tremendous burden on a small group. I don't believe a small group could maintain a small co-op at a reasonable cost. Not enough to keep one man busy. Maybe you could contract a man to come in periodically to check equipment. It seems necessary to me to have somebody definitely reliable for the maintenance of it and a large co-op will be necessary to support proper personnel to maintain

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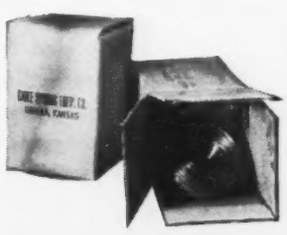

CABLE SPINNING EQUIPMENT CO.

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it. . . . That brings us down to rates. They must be sufficient to bring in sufficient revenue to maintain, pay interest, amortize it and take care of all charges that come along. There is no use to start unless you and your neighbors would be willing to pay the amount necessary to pay for that kind of service. The government expects loans to be paid with interest on time.

"We have made a cost study and feel that it might be possible to render that service for somewhere around $2.50 a month—we're not sure, but that's about where it would land. . . ."

Mr. Adams explained that "when we brought electric service down to your place, you probably spent $150, $200, $250, to wire your premises. You bought a refrigerator, water heater, range, feed grinder, water pump, toaster, radio, until possibly each one of you has $450 invested in electrical equipment to every dollar that the cooperative has invested. In the telephone business, if I went to Charlie Jones, we just say 'Charlie, where do you want it put?' Get the telephone connected up and he has telephone service. How much do we have invested? $300, $400, maybe $500, or maybe more.

"Maybe Charlie would take that service for 30 days, six months or two years. Then, he decides he must cut down some place. Have the telephone disconnected, which he can do. If he and a few hundred more do that, then your telephone cooperative would be in a bad way because that investment is there whether he uses that phone or not. The income doesn't increase with use like the electric system. We have a problem there and must fix it some way so that the member has enough interest that he doesn't discard his telephone without thought."

Mr. Davis said, "It seems that it would be necessary for each person receiving telephone service to place some sort of a deposit with the organization in the form of an equity. When the organization got large enough to stand on its own feet, we could maybe after the first five or 10 years return the deposit which would have to amount to five or 10 percent of the total cost of the telephone installed. . . . The system will cost a lot to operate and maintain . . . as much with all as with 750 or 1,000 less.

"Suppose we build this line down the road. John Jones, Pete Smith want it, but that and that one don't. Eight are on the party line, just enough to take care of one party. Then this fellow and that one will want one. You can't do that like you would electric service—hang another transformer and hook on. If we did, we would have too many on the party line.

"We have to put the thing on a sound basis and be able to make it go. From the places inspected it doesn't seem possible to use any of the old equipment. We'll have to start new and put in a modern system. I don't think the old switchboards where there isn't 24-hour service should be fooled with at all. . . ."

Kentucky Co-op Files Loan Application

A formal request was filed recently for an REA telephone loan for the newly organized South Central Kentucky Telephone Cooperative, Glasgow, Ky.

J. B. Galloway, manager for the Farmers Rural Electric Cooperative Corporation, Glasgow, Ky., said the loan application was made to the government under provisions of the

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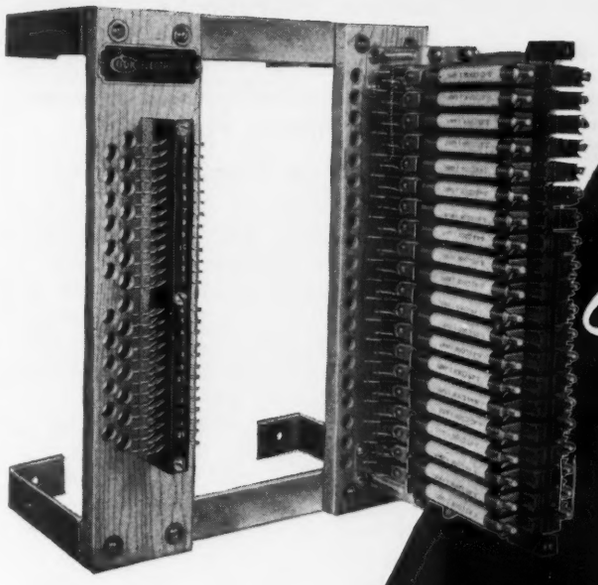

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L-9 Wall Distributing Frame

THIS TYPE distributing frame has been developed through years of experience, for economical distribution and protection of limited capacity cable, and especially for installation in small Rural and unattended exchanges. It is made in 20, 40, 60, 80 and 100 pair sizes and is designed to carry any one of the four types of Cook Protectors shown at the right. The frame consists of two iron mounting brackets, and two highly finished kiln dried maple mounting pieces, one numbered for the protector bank, and the other drilled and equipped with the line terminal blocks.

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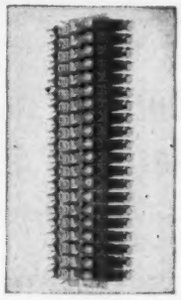
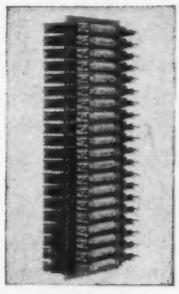
Central Office Protectors



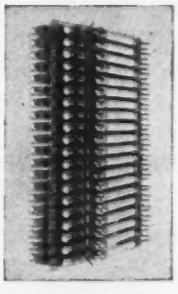
TYPE NO. 100

For cable termination and protection of central office equipment and personnel from high potentials and sneak currents. Pairs are mounted on ½" centers. In operation the No. 100 Protector opens the switchboard circuit, grounds the outside line and operates an alarm signal.



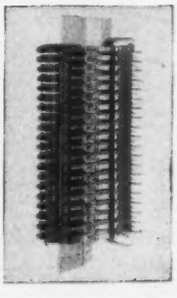
TYPE NO. H-36

Provides fuses and lightning arresters and is fireproof. For small town rural exchanges where sneak hazard does not exist, the H-36 Protector offers an ideal protector unit.



TYPE NO. 105

Provides fuse protection in addition to lightning arresters and heat coils for the protection of central office personnel and equipment. Pairs are on ½" centers. This protector is especially recommended for the protection of toll line and carrier circuits.



TYPE NO. 3800

For cable termination and protection of central office personnel and equipment against high potentials and sneak currents. Pairs are mounted on ⅜" centers. The No. 3800 Central Office Protector offers the same combination of protection features as the No. 100.

rural telephone act passed by Congress last October.

Application for the loan was made following a meeting at which the telephone cooperative was formed, the first in Kentucky. At present the organization is scheduled to serve only citizens of Barren, Metcalfe and Hart Counties, the same as the Glasgow REA office.

However, Mr. Galloway said the cooperative is organized so that other counties and communities may be included. Representatives from Green County have discussed joining the cooperative but no action has yet been taken.

At the meeting, Dr. James J. Crouch, Glasgow, was elected president, Paul Young, of Horse Cave, was chosen vice-president, and James E. Gillenwater, Glasgow, secretary-treasurer.

A preliminary survey of only the three counties has resulted in 1,800 applications for telephones in the new organization, Mr. Galloway said. Further surveys of the area will be made to supplement present telephone information. Organization of the telephone cooperative has followed a series of meetings held among farmers of the area.

Farm Bureau Plans Telephone Co-op

The Hot Spring County Farm Bureau, Malvern, Ark., plans to use the new Rural Telephone law if necessary to get telephone service for its farmers. This farmer's organization, through its telephone committee, has been active for 18 months in getting service for over 500 farmers.

The farm bureau held a meeting at Bismarck recently to see what immediate steps the farmers wanted to take to get telephone service in the western part of the county. More than 100 farmers and their wives attended this meeting to decide whether they wanted to organize a co-operative telephone company or receive service from the nearby Southwestern Bell Telephone Co.

W. F. Saunders, vocational agricultural instructor and community leader of Bismarck, presided and R. H. Anderson, president of the farm bureau, explained how the farm bureau helped farmers obtain various services such as telephones. Buford Prince, committee member, told what the committee had done and planned to do.

W. J. R. Browder, extension service agricultural engineer, explained the Hill-Pogue bill and explained that long term loans at low interest rate would be advisable to qualified groups for building new telephone exchanges.

W. Q. Warren and Jerry Poe, representatives of the Southwestern Bell Telephone Co., explained why their company had not made service available and said that their company could not render service in 1950, unless there was some change in plans.

The farm bureau has gone on record as favoring service from the Southwestern Bell, but since the company could not make service available, the bureau plans to make every effort to organize a co-op telephone exchange.

Reno Telephone Co. Granted Charter

Reno Telephone Co., Inc., Abbyville, Ks., was authorized $60,000 capital stock recently. The company also completed incorporation papers. Incorporators, all of Abbyville, were J. J. Gagnebin, John R. Wagler, Vesta M. Gagnebin, and Esther E. Wagler.

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Two years ago directory revenues for a Midwestern city showed a remarkable increase of 213% over the previous year. That was the first Loomis-sold directory. Recent figures show a 45% increase over those revenues this past year! Today's $10,800 in the book nearly quintuples the old . . . in two years!
What's more, the Loomis Directory Specialist on this job says they aren't finished, yet. Continuing steps to better directory utility and appearance will bear results this year. Are you satisfied with the progress of your directory?
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(Continued from page 36)

that is in otherwise good condition by drilling a hole through the split end and bolting the split portions together. It is now possible to do a better and faster job by using a stainless steel band to bind a split end. The band is tightened with a special lag binder made for this purpose. It is claimed that the band will remain permanently tight, and, because it is made of stainless steel, it will never corrode. This method can be applied to the binding together of a split pole top and the fastening of riser pipe to poles at underground railway crossings.

Nylon Braid Cords Prove Their Worth

IN TESTS conducted by a telephone company to determine the advantages of nylon braid switchboard cords, a number of these cords were placed alternately with standard cotton braid cords on a busy toll position. These cords have been in service more than five years without any signs of the hard service they received, except for soiling, and are still in use. The cotton braid cords, on the other hand, lasted only an average of two and one-half years.

Tractor Mounted Ladder Saves Time on Trimming Jobs

IN EXTENSIVE tree trimming work, where valuable trees must be carefully pruned in order to avoid ruining their appearance and impairing their health, it is often necessary to work in the trees or from extension ladders to reach certain limbs and branches to be removed. This is a time consuming task and in such cases, the labor cost goes up fast.

One enterprising company has been

Fig. 11—Tractor mounted extension ladder in use.

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Ideal for warehouse floors, loading docks, walks, platforms — easily installed over wood, concrete or composition floors— outwears either.

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making use of an extension ladder of considerable length mounted on a caterpillar tractor to save time in removing the tree limbs. *Figure* 11 illustrates how one man with tractor operator can quickly and easily prune away branches from cable or open wire lead. The ladder can be raised or lowered like a derrick boom to bring the worker to the desired location in a tree. The ladder can also be shortened, lengthened, or swivelled around, as required, in this process, so that the upper branches of very tall trees can be reached.—THE END

Gary Group Makes Organization Changes

The following changes in executive and administrative personnel in several of the Gary Group operating telephone companies have recently been announced by A. S. Crane, chief executive of the Gary Group Operating Division.

G. A. Klein, who has been vice president and general manager of the Nebraska Continental Telephone Co., Columbus, Nebraska, since 1947, has been elected president of Southern Continental Telephone Co. and is making his headquarters at Cookeville, Tennessee. Prior to going to Nebraska, Mr. Klein was plant superintendent for the Community Telephone Co. of Wisconsin, Black River Falls.

Earle Blomeyer, Kentucky manager of the Southern Continental Telephone Co. with headquarters in Elizabethtown, Kentucky, has been elected a vice president and director of that company.

K. L. Schroeder, until recently with the De Kalb-Ogle Telephone Co., Sycamore, Illinois, has taken up duties as vice president of Nebraska Continental Telephone Co., Columbus, Nebraska, succeeding G. A. Klein. Prior to joining the De Kalb-Ogle company, Mr. Schroeder was associated with the Ohio Consolidated Telephone Co. as district manager of the Cadiz District.

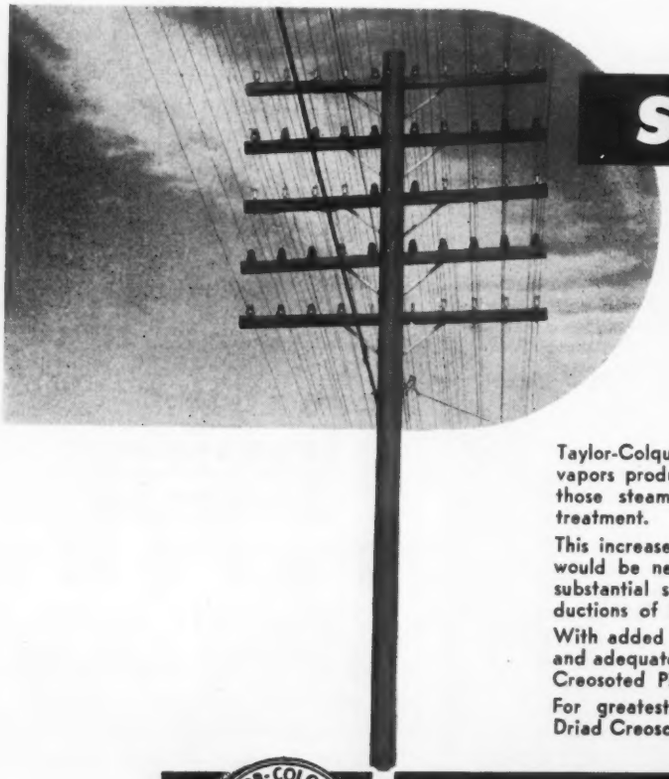
T. H. McChesney, who for the past several years has been assistant general manager of the Missouri Telephone Co., Columbia, Missouri, has accepted an appointment as general superintendent of South Carolina Continental Telephone Co. and Sumter Telephone Co., and has taken up his duties in this capacity at the headquarters of both companies at Sumter, South Carolina.

R. S. Griffin, formerly assistant general manager, Iowa Telephone and Telegraph Co. and Iowa Continental Telephone Co., Grinnell, Iowa, has been promoted to the position of general manager. Prior to going to Grinnell, Mr. Griffin was associated with United Telephone and Telegraph Co., Dothan, Alabama, and earlier with Continental companies of the Gary Group.

John J. Moran, who has recently been associated with Southern Continental Telephone Co., is now making his headquarters at Portsmouth, Ohio, as engineer for Ohio Consolidated Telephone Co.

Paintsville, Ky. Companies Sold To R. M. Goodman

The Johnson County Telephone Co., and the Valley Telephone Co., Paintsville, Ky., formerly owned by W. H. Irwin, have been purchased by R. M. Goodman, Marietta, Ga., and consolidated under the name of Valley Co. The new firm is under the management of Mr. Goodman.



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For greatest long time economy always specify Taylor-Colquitt Vapor Dried Creosoted Pine Poles.

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LOCUST PINS

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Oak pole brackets of unquestioned quality are in demand now as never before in the face of the qualifications necessary in the equipment and materials needed today to "keep 'em talking." Present day maintenance and repair have every reason to demand and get only the best.

GLASS INSULATORS

Research and experiment have produced in Hemingray insulators a glass insulator that is better than any ever before offered.

Non-porous, non-deteriorating, uniform coefficient of expansion and high mechanical as well as high dielectric strength are some of the many qualities that rank Hemingray the "best on the line."

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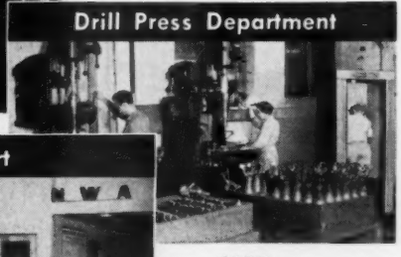

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General Tel. Subsidiaries Announce New Officers

Several subsidiaries of General Telephone Corporation elected new officers and directors recently.

At a meeting in Madison, Wis. on March 27, T. Holden Moran was elected president of Commonwealth

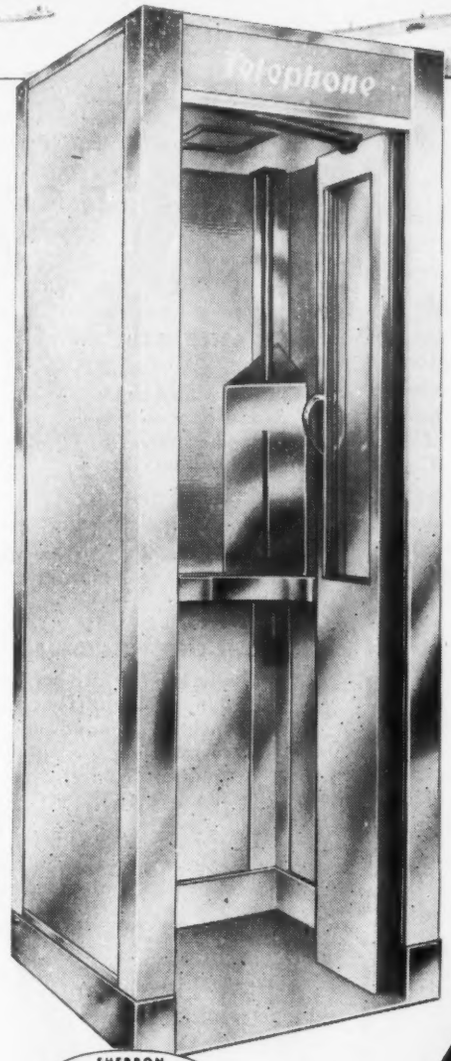
T. Holden Moran, president, Commonwealth Telephone Co.

Telephone Co. to succeed Burton W. Saunders. Mr. Saunders will continue as president of Illinois Commercial Telephone Co. and as a director of Commonwealth.

On the same day, L. H. Meyer was elected president of Central Vermont Telephone Corp. and on the following day he was named president of Upstate Telephone Corp. of New York

L. H. Meyer, president, Central Vermont Telephone Co., Upstate Telephone Corp. of New York, and Tri-State Associated Telephone Corp.

Modernize for Modern eyes ...*and ears*



SHERRON ACOUSTIC STAINLESS STEEL TELEPHONE BOOTH

Model No. 19S, Type 3
30" x 30" x 83¾"

with SHERRON ACOUSTIC STAINLESS STEEL TELEPHONE BOOTHS

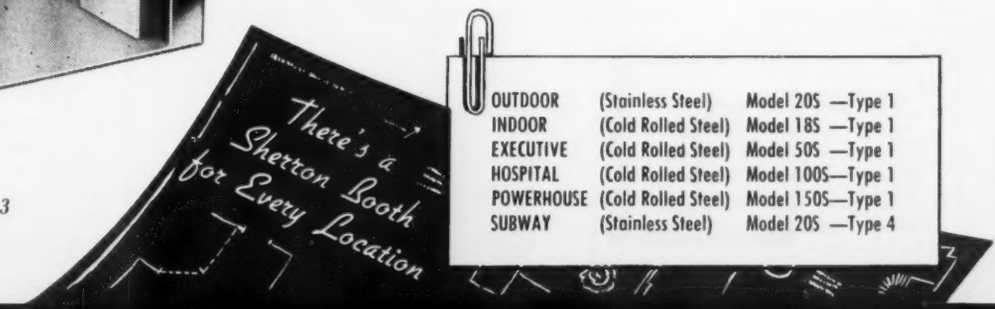
Functional simplicity is the ideal of modern design. It is evident everywhere. All present day construction is along clean cut, graceful lines. The rococo is outmoded. The flamboyant is obsolete.

In telephone booths, Sherron Acoustic Stainless Steel booths set the industry's standards for modern design. Their pleasing symmetry makes them suitable for any of today's locations. In acoustic performance, they are in a class all their own. The stainless steel walls shut out most noises, and the sound insulation between the panels absorbs and deadens any noises that might otherwise seep through.

In every respect, Sherron Acoustic Stainless Steel fireproof booths are a far cry from the antiquated tinder boxes which are still designated as telephone booths, but which are destined to disappear into the limbo of museum pieces.

The complete superiority of Sherron booths makes them superior money-makers, as well. Make them your first choice for preferred locations . . . and for installations in your replacement program.

Write today, for full details.



OUTDOOR	(Stainless Steel)	Model 20S —Type 1
INDOOR	(Cold Rolled Steel)	Model 18S —Type 1
EXECUTIVE	(Cold Rolled Steel)	Model 50S —Type 1
HOSPITAL	(Cold Rolled Steel)	Model 100S—Type 1
POWERHOUSE	(Cold Rolled Steel)	Model 150S—Type 1
SUBWAY	(Stainless Steel)	Model 20S —Type 4

SEE OUR CATALOG IN SWEET'S

SHERRON METALLIC CORPORATION
1201 FLUSHING AVENUE • BROOKLYN 6, NEW YORK

WHAT DO YOU PREFER for DROP WIRE?

Paragon, one of the earliest suppliers of drop wire to telephone companies, offers a complete selection of conductors—and each in either of two types of protection.

In ordering from Paragon you can pick your preference.

Paragon H. T. Bronze

No. 17 B&S gauge

A High Tensile B.B. Bronze with rated 80% conductivity. It is very strong—with a rating of 90,300 P.S.I. minimum. A strong servicable drop wire—available in twisted or parallel pair in Paraprene or Weatherproof braid protection.

Paragon Copperweld

No. 18 B&S gauge

One of the most popular conductors because of its strength and workability. Conductivity rating is 30%. Strength rating 133,000 P. S. I. minimum. Available in twisted or parallel pair in both Paraprene or Weatherproof braid protection.

Genuine IRONITE

18 or 19 B.W.G. gauge

The old popular iron conductor—protected by modern "Flozinc" process, plating. Offers strength, conductivity and workability with economy in cost. Available in twisted or parallel pair in Weatherproof braid protection.

The life of a drop wire depends largely on the weather protection. All Paragon "drops" are offered in either—

Paraprene Insulation

A specially processed rubber insulation that really adheres (sticks to) the conductor—encased in a seamless sheath of Paraprene. This is tough, weather and wind resistant. Not affected by heat, cold, high alkali wind, moist salt fogs, oil, acid, etc. A most satisfactory insulation.

Weatherproof Braid Insulation

The same specially processed rubber with high adhesion to the conductor, is encased in a woven braid of long staple cotton and mineral fibers that are tough and weather resistant. Impregnated and finished with hot stearine pitch and powdered mica, this insulation (U.R.C. Spec.) resists hot dry wind or damp salt fog, heat, cold, etc. The old dependable insulation — much improved.

All Paragon Drop Wire is packed in approx. 1000 ft. coils in heavy individual cartons.

Paragon also offers a complete line of Interior, Duct, Jumper, Ground and Tree Wire available for prompt shipment

PROMPT SHIPMENTS from CENTRALLY located factory— SYCAMORE, Ill.

Write for samples and prices.

Ask for Bulletin 412

Telephone Division

PARAGON ELECTRIC CO.

TWO RIVERS **WISCONSIN**

Harry J. Huether, Jr., president and general manager, Lexington Telephone Co., and Ashland Home Telephone Co.

and Tri-State Associated Telephone Corp. All three offices had been vacant since last November. He was formerly vice president and general manager of all three companies.

At meetings held in Lexington. Ky., Harry J. Huether Jr. was elected president and appointed general manager of Lexington Telephone Co. and Ashland Home Telephone Co., effective April 1. The posts of president of these two companies had been vacant since L. F. Shepherd resigned on March 1 to become president of Pennsylvania Telephone Corp., another subsidiary.

L. O. Evenson, who has been vice president and general manager of the Lexington and Ashland companies,

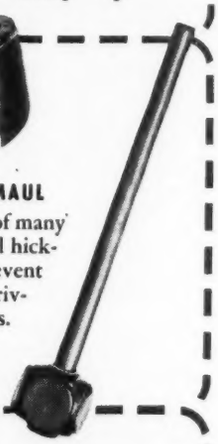
Ralph D. Heusel, vice president, Indiana Associated Telephone Corp., & Michigan Associated Telephone Corp.

SAVE TIME on ANCHOR INSTALLATIONS

CHANCE TOOLS Make the Job Easy

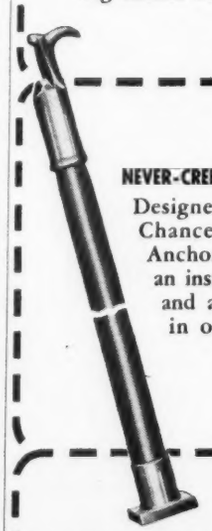
TELESCOPING TRIP AUGER

Bores like a bit, telescoping rod from 5 to 8 feet, adjustable reamer for various hole sizes, easy dump trip.



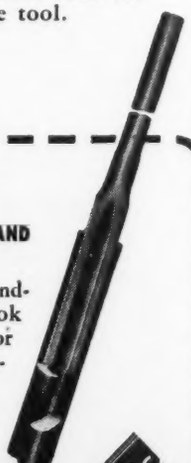
NEVER-CREEP MAUL

This handy tool of many uses has seasoned hickory inserts to prevent damage when driving anchor rods.



NEVER-CREEP INSTALLING BAR

Designed for use with Chance Never-Creep Anchors, it combines an installing bar, tamp and anchor retriever in one tool.



ANCHOR EXPANDING AND TAMPING BAR

For use with expanding anchors. Hook wraps around anchor rod to prevent sliping off anchor top plate.

Write for Complete Information

ABC INDUSTRIES

A·B·CHANCE CO·

CENTRALIA, MISSOURI.

I. F. KREHBIEL, president, Interstate Telephone Co.

resigned, effective April 1, to become vice president of Southwestern Associated Telephone Co. Ralph D. Heusel, formerly general auditor of the Kentucky companies, was elected vice president and a director of both. He was also elected vice president and a director of Indiana Associated Telephone Corp. and Michigan Associated Telephone Co. He will be succeeded as general auditor of all four companies by Frank A. Peter.

At a directors' meeting in Spokane, Wash. on March 30, I. F. Krehbiel was elected president of Interstate Telephone Co. Mr. Krehbiel, who had been vice president and general manager since 1948, succeeds C. E. Johnston, who was named chairman of the board.

At a meeting in Lafayette, Ind. on March 22, Herbert E. Hussey was elected president of Indiana Associated Telephone Corp.

Herbert E. Hussey, president, Indiana Associated Telephone Corp.

from every angle

there's a good reason for choosing the

CHANCE STEEL 8-Way Expanding Anchor

Here's what the men who buy and use them say: **Linemen**—"We don't have so much weight to carry."—"It takes fewer licks to expand." . . . **Foremen and Construction Superintendents**—"We do save some time and labor."—"There's no danger of breakage."—"We can tell when this anchor is expanded." . . . **Storekeepers**—"They're easy to handle."—"Your colored identification tag is a big help." . . . **Engineers**—"We can depend on the uniformity of steel."—"You've taken full advantage of all the area."—"Our tests show it has surprising strength."—"The cone shape is a good idea—you get a wedging action." . . . **Purchasing Agents**—"Any time we can satisfy ourselves on quality at a price we like—we're happy." . . . **Management**—"We've seen convincing proof that our lines are going to stay put with your 8-Way in the ground." . . . Whether you represent one or a combination of the men above—there's good reason for choosing the Chance 8-Way Expanding Anchor . . . You get more for your money.

Available for 6" and 8" Holes

You know it's RIGHT when you specify CHANCE

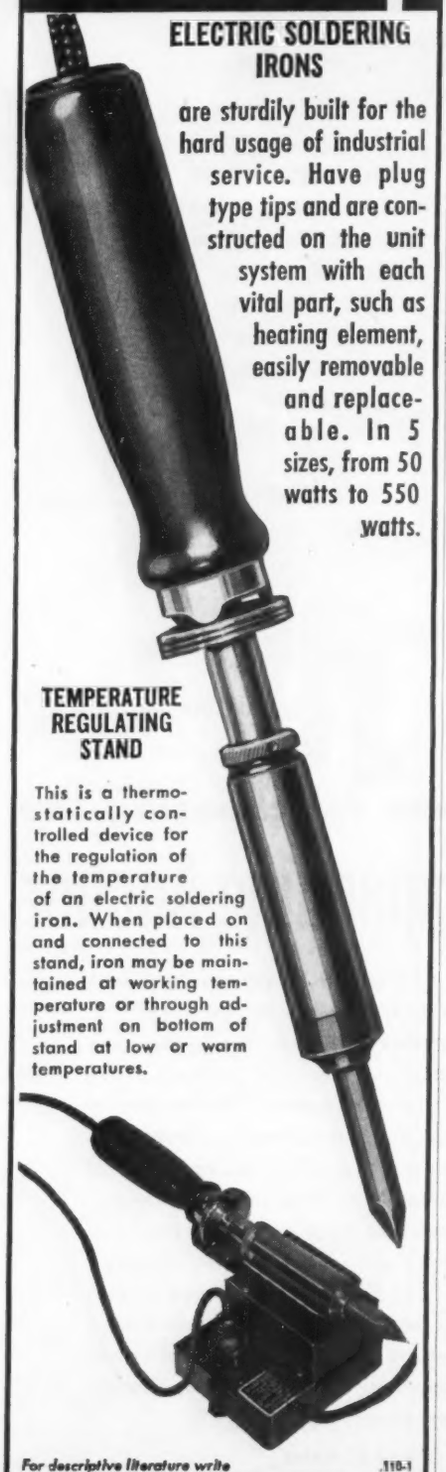
C50-9C

A·B·CHANCE CO.

CENTRALIA, MISSOURI • SAN FRANCISCO, CALIFORNIA

ABC INDUSTRIES

American Beauty



ELECTRIC SOLDERING IRONS

are sturdily built for the hard usage of industrial service. Have plug type tips and are constructed on the unit system with each vital part, such as heating element, easily removable and replaceable. In 5 sizes, from 50 watts to 550 watts.

TEMPERATURE REGULATING STAND

This is a thermostatically controlled device for the regulation of the temperature of an electric soldering iron. When placed on and connected to this stand, iron may be maintained at working temperature or through adjustment on bottom of stand at low or warm temperatures.

For descriptive literature write .118-1

AMERICAN ELECTRICAL HEATER COMPANY
DETROIT 2, MICH., U. S. A.

Small Company Talk

(Continued from page 46)

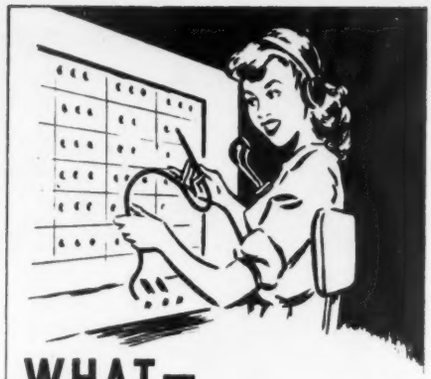
money later on. This job of buying a new board is a big one, and is as difficult as it is important. It was touched on here simply to illustrate another use of the peg count.

We have not yet talked about peg counts on Automatic boards. Here, of course, there is no question of determining an operator hourly load. The job is to determine the peak loads that the switchboard will be required to handle, which, in turn, will determine the number of connecting circuits (finders, connectors and selectors) required. The percent switching facilities provided in an automatic board has much to do with the price of the board, and the percent switching provided should be gone into thoroughly and carefully. Too small a percentage will provide poor service; too much will waste money. It goes without saying, I believe, that practically all such errors are on the side of too little, and when a subscriber keeps picking up his telephone time after time and is unable to get a dial tone, he soon gets disgusted.

The first job, then, before the purchase of the automatic board, is to determine what this percentage will be. And don't forget that the installation of dial service will almost undoubtedly increase your average calling rate per station.

The next job is to watch the board after it is in to see if it is able to handle its requirements. In practically all automatic boards, automatic meters register the number of calls, and there is usually, in addition, a meter to record each instance of "all switches busy". Reading this meter tells you how many times within a given period a subscriber was unable to get a connection because all of the switching facilities of the board were already in use. These meters can be read at periodic intervals, hourly, daily, weekly or monthly, according to the situation, and indications thus recorded as to the conditions being encountered. Long distance trunks attached to automatic boards also usually have meters on them, plus an additional meter to record each instance of "all trunks busy". This information is also valuable in determining the need for additional trunks.

We now come to the question of



WHAT— *Nylon* CORDS?

***Yes*—and they're**

1 **TOUGH**
Nylon thread used for the covering of these cords provides a superior tough outer braid capable of hard service.

2 **DURABLE**
Switchboard cords are subject to severe wear. Nylon covering gives long and exceptionally satisfactory service under hard usage.

3 **WATER-PROOF**
Chemists recognize Nylon as a material highly resistant to moisture and acids.

4 **MILDEW-PROOF**
Where mildew is likely to occur these Nylon cords are immune to its destructive action.

5 **RUGGED**
The unusual tensile strength of Nylon provides a ruggedness far beyond other types of cords.

6 **BEAUTIFUL**
The very name Nylon suggests beauty, quality and refinement. These cords live up to the name in every respect.

ASK FOR

Runzel **V.N. SERIES** ***Nylon***

SWITCHBOARD CORDS

RUNZEL
Cord and Wire Co.
4723 W. MONTROSE AVE.
CHICAGO 41, ILL.

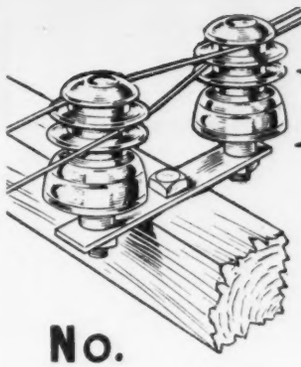
how often these traffic studies should be made. Our average over the past several years has been about once a year—perhaps a little more often when we thought, by observing the board, that one was needed. In a rapidly growing company, a study more often than that is desirable. As a practical matter, however, sometimes it is hard to get around to all of the things that should be done. Once a year, then, I would consider as the maximum length of time. Another rule that we haven't followed, but which I know would be good practice, would be to take the study at the same times each year, if more than one count a year is taken. Special counts, for special purposes, can and should be taken as the need arises.

There are methods by which the load can be guessed at—fairly accurately—each month. Then, when the figures indicate that the load has grown sufficiently to warrant a rearrangement or addition of operating hours, a peg count can be made. One way, in a small company, to do this job is as follows. At the time of the last peg count, determine the calling rate per station—the average number of calls that each phone makes during a day. At the end of each month multiply this by the number of stations in service—this will give you the daily local call load. Then count the tickets for several days, and get an average number of tickets that are being handled each day. Multiply this by the figure 15, or 25, whichever is applicable, and this will give you the long distance load for a day. Add the local to the long distance, and compare this figure with the ones derived in your last peg count. If there is a substantial difference, it probably means that you need to take another detailed peg count and rearrange or add to your operating hours. A little thought will probably give you a simple method of computing your probable average daily traffic load in your own exchange that will take very little time and provide reasonable accuracy.

But whatever you do don't forget your peg count. It's a useful little technique that will eliminate a lot of guessing that you have to do, and will render better, easier and more accurate, the guesses that still must be done.

Wyoming Company To Operate In Big Piney

The Big Piney (Wyo.) Telephone Co. has filed an application with the Wyoming Public Service Commission for authority to operate.



New
Hemingray
DEEP GROOVE TRANSPOSITION
No. 56 Insulator
ELIMINATES TIE WIRES

Smaller, lower in cost than other deep groove insulators, this new Hemingray No. 56 was designed especially for "point type" transpositions on rural lines. Extra-deep grooves eliminate need for tie wires. Retranspositions can be made without cutting by simply rolling in old lines at transposition points. No special hardware is required —insulators can be mounted on tandem bracket, as shown above, or on standard four-pin brackets. Packed 40 to a carton.

Recommended and Sold Through Our Distributors

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Distributors in U. S. and Possessions: Automatic Electric Sales Corporation
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'50 P&H PENTA

PENTA POLES

FULL LENGTH TREATED *NORTHERN* WHITE CEDAR

The full length treatment protects Penta poles from top to butt.

Their long life assures low per annum cost lines.

PAGE AND HILL, INC.
MINNEAPOLIS, MINN. • 50 CHURCH ST., NEW YORK, N. Y.

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(Continued from page 39)

can find the exact point and make the necessary repair.

The Wisconsin Telephone News comments that with the new dry weather insulation test sets in use, plant maintenance forces now are better able to make routine checks of thousands of telephone circuits, removing the potential troubles without the subscriber knowing his line is being cleared to assure continuous, reliable telephone service.

Tree Felling Jack Guides Tree Fall

A SPECIAL jack has recently been developed for use in felling trees in the proper direction. This tree felling jack is designed to apply the right pressure against a tree so that it is pushed the correct amount while it is being sawed. This pressure is just enough to prevent the saw from pinching, while a long "follow through" shove is given to the tree just as the cut is finished (*Figure* 5).

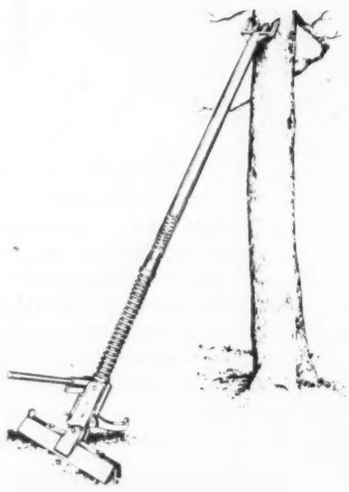


Fig. 5—Details of Jacobs Tree Felling Jack.

The tree felling jack has a combination of two springs. A heavy spring starts the tree and then a lighter spring automatically kicks in to continue the "follow through" action, insuring the falling of the tree exactly where the operator wishes, regardless of its direction of lean or the wind direction.

The tree can be thrown straight away from the jack or it can be set as an "A" frame, throwing the tree directly to the right or left of the jack. The exclusive spring invention permits this sideways throw and the hinged jack base folds as the tree falls, thus keeping the base flat on the ground. The base has lugs to prevent slipping on frozen ground or ice. This "sideways" tree felling action, in addition to the "straight away" usual tree felling direction, is sometimes useful on hill sides or with a badly leaning tree, and permits the handling of almost any situation. By moving the base of the jack to the right or left a foot or two, the direction of the tree fall can be easily secured when using the jack as an "A" frame. The spring tension in this case is set just to "hold" the tree and not "throw" it straight away from the jack.

The special 4-pointed fork at the top of the steel tube will hold either small or large trees and prevents them from turning as they fall, because the special "follow through" spring maintains pressure of the fork against the tree as it falls.

Exact control of the spring pressure permits the correct pressure to be applied to the tree to eliminate any splitting (as the tree is moved just enough while sawing, to keep the saw from pinching) and then thrown as the cut is finished. The use of this jack saves time and work in undercutting.

The tree felling jack should be just the thing for telephone companies to use in their line clearance programs where it is necessary to cut down trees growing by open-wire lines. This tool makes it unnecessary to rope guy a tree in order to direct the fall of the tree. It is claimed that this jack provides complete safety for the operator and his saw rig.

The bottom part of the jack is removable enabling it to be used in lifting or holding logs for cutting into lengths and de-limbing with freedom from binding or grabbing of the saw.

This unit is light-weight (30 pounds) and can be easily transported.

STROMB

individual station protector

reliable 955

MFD. BY RELIABLE ELECTRIC COMPANY

- One-piece Design
- Simplified Mounting
- Asbestos Mats Eliminated

The very simplicity of the Reliable 955 is assurance of long, trouble-free service. Fuses are mounted on a one-piece, low absorption porcelain, well spaced for convenient connecting. Reliable Self-cleaning Sawtooth Discharge Blocks are standard, dissipating static without time lag or danger of grounding the line. The 955 uses No. 55L, seven ampere ceramic fuses.

"Reliable Identifies the Quality"

STROMBERG-C

STROMBERG Telephone CARLSON

TELEPHONES, SWITCHBOARDS

MBERG-CARLSON recommends...

"dependable" *means both the trade-mark & the guarantee of cross-arms by*

American Cross-Arm Inc.

The finest pole and wire installation is useless if cross-arms fail. "Dependable" Cross-Arms are all that the name implies—made of sturdy, American woods, long seasoned, fashioned and finished to stand every weather condition from desert heat to mountain blizzards.

In Douglas Fir—Creosoted Yellow Pine or Gulf-Red Cypress.

for the safety of your linemen, specify

buckingham equipment

Dedicated to the proposition that a lineman on a pole is only efficient as long as he's safe!

Buckingham makes everything (and everything good!) that a lineman needs. Famous Stephens climbers, in all weights and sizes . . . tree climbers with 3½ in. gaff . . . safety seats, straps and pads . . . tool belts, bags, buckets and saw scabbards . . . "protecto grips" and thread cleaners.

Play safe! Buy through Stromberg-Carlson the products of Buckingham.

for rural lines with fog, rain, humidity—

hemingray insulators

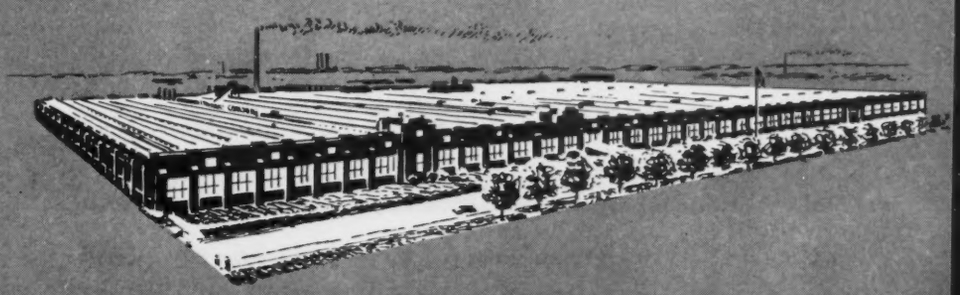
(Left): Hemingray "No. 9." Made from only 9 oz. of glass, but with a maximum leakage path approaching standard long-distance design. Inner skirt surface well protected from rain-splash; long skirt protects pin itself.

(Right): Hemingray "No. 14." Its double-petticoat feature is useful wherever fog and humidity prevail. Production economy in design and lightness make its low cost attractive for rural telephone line budgets.

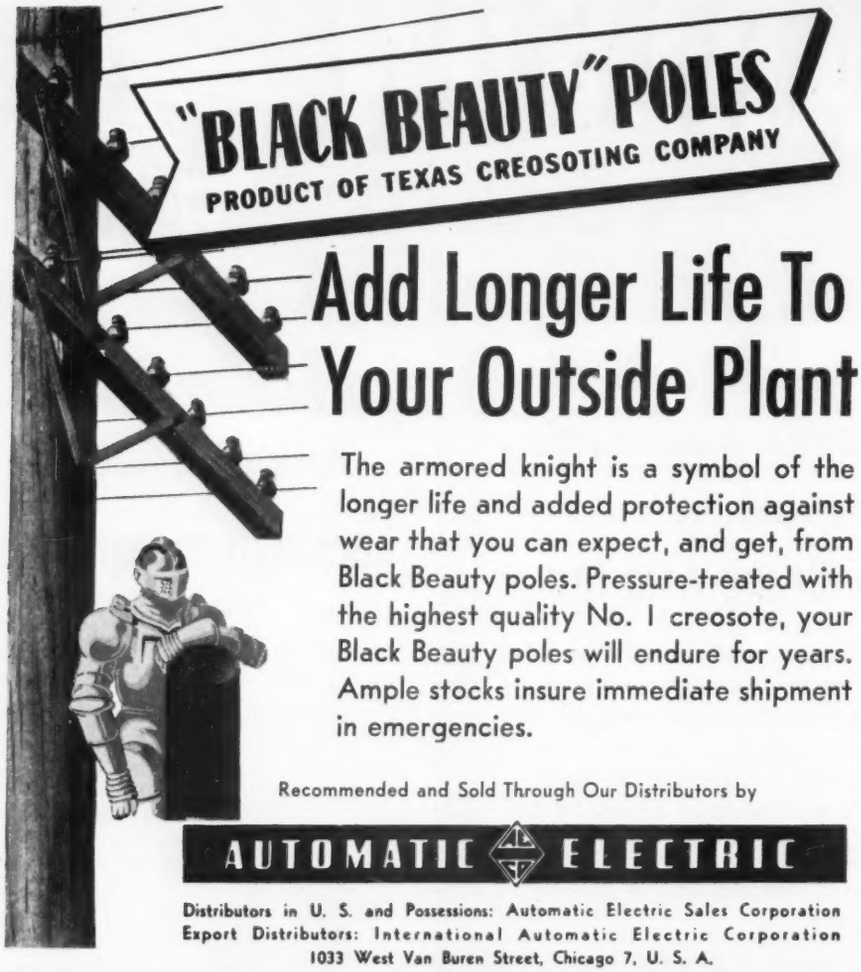
Manufactured by American Structural Products Company

RG-CARLSON

Factory, General Offices: Rochester 3, N.Y.
Branch Offices: Atlanta 3, Chicago 6, Kansas City 8, San Francisco 3. In Canada: Stromberg-Carlson Co. Ltd., Toronto



EQUIPMENT AND ELECTRONIC CARILLONS • INDUSTRIAL, INTERCOMMUNICATION SYSTEMS • RADIOS, RADIO-PHONOGRAPHS, FM AND TELEVISION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PRODUCT OF TEXAS CREOSOTING COMPANY
Add Longer Life To Your Outside Plant
The armored knight is a symbol of the longer life and added protection against wear that you can expect, and get, from Black Beauty poles. Pressure-treated with the highest quality No. 1 creosote, your Black Beauty poles will endure for years. Ample stocks insure immediate shipment in emergencies.
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Weatherproof Braided Drop and Bridle
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ALPHADUCT WIRE & CABLE CO.

Milltown, New Jersey Telephone: Milltown 8-0030

Inductive Interference

(*Continued from page* 33)

The "R" Transposition Scheme

THE NEW Bell System R-1 and R-2 transposition schemes are simple yet surprisingly effective in keeping noise levels low on heavily exposed short haul toll and rural lines. These schemes are surprisingly simple as compared to the standard transpositions schemes normally employed on toll or exchange lines. They consist (See *Fig.* 7) in transposing each pair at every other pole. Transpositions on horizontally or vertically adjacent pairs are staggered so as to fall on different poles. Control of crosstalk between pairs not horizontally or vertically adjacent is accomplished by the omission of certain transpositions on each 25th pole. The R-2 scheme is the same as the R-1 except spacing between transpositions is doubled. Tandem transposition brackets are used.

Noise From Series Unbalance

THE MOST easily overlooked source of unbalance and one which is frequently a prominent contributor to the overall noise is a difference in the series impedance constants of the telephone circuit. This results primarily from high resistance connections in line wires, at junction poles, in terminals, and even in the jumpers on the main frames.

In one case that I know of noise was traced to obsolete type of self soldering heat coils which were contributing resistances as high as 200 ohms.

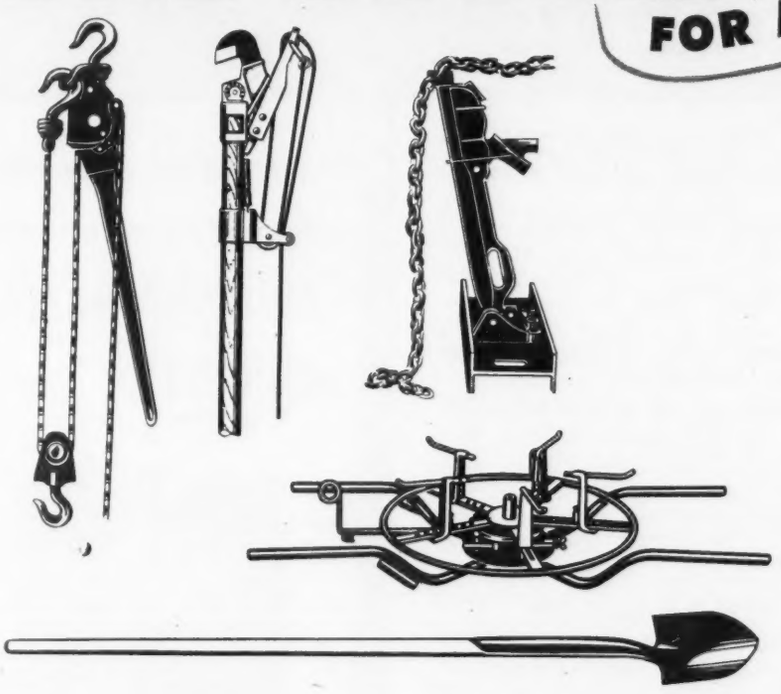
Careful mile-by-mile resistance checks of line wires will disclose high resistance splices. Connections at junction test and terminal poles should be examined and properly sleeved to avoid noise contribution due to high resistance at these points.

Series Unbalances Show Up Where Drainage Coils are Used

SERIES resistance unbalances in rural or toll circuits may not be substantial contributors to the noise picture as long as a line is isolated from ground. But when the line is worked with an electrically balanced

(*Please turn to page* 68)

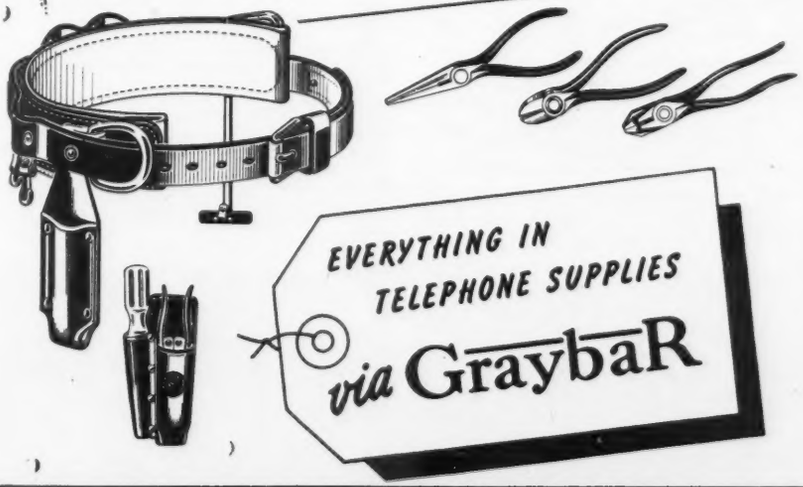
ONE SOURCE FOR ALL YOUR TOOLS



Why spend time shopping around for tools? From nearby Graybar you can fill all your requirements with just one order—and be sure you're getting dependable items. Graybar, pioneer supplier of tools and pole-line items to the independent telephone industry, has always selected only proven products of leading manufacturers who serve this industry.

Having all the right tools available when your linemen need them will increase job efficiency and avoid costly delays. Look over your tool inventory for shortages and antiquated or worn equipment—then check it against the following list of Graybar-distributed tools:

- blocks, snatch blocks, pulleys, jacks
- blowtorches, furnaces
- hoists, load binders, pole binders, tuggers
- ladders, rope
- line trucks, trailers, pole derricks, winches
- pole supports, pike poles
- peavies, cant hooks, carrying hooks
- pliers, screwdrivers, knives, wrenches, grips
- shovels, spoons, digging bars, tampers
- sleeve clamps and twisters, temporary guy clamps
- tool bags, belts, safety straps, tool pockets
- trimmers, lopping shears, saws
- wire reels
- hot-line tools: hinged universal tools, storm tools, insulated wire cutters, grounding sets
- safety equipment and first aid kits



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Your local Graybar Representative, as an employee-owner is anxious to make your order his personal responsibility—he'll see that you get prompt deliveries. In addition, the experience of a Graybar Telephone Specialist is always available to help you solve any unusual technical problems.

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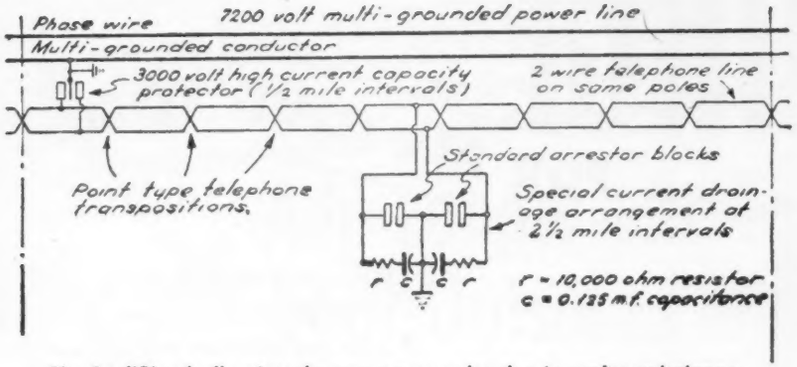
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7200 volt multi-grounded power line
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3000 volt high current capacity protector (½ mile intervals)
2 wire telephone line on same poles
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Special current drainage arrangement at 2½ mile intervals
r = 10,000 ohm resistor
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Fig. 8—"Bleeder" networks may cause noise due to series unbalance.

ground connection as for example in connection with a bleeder network rents in passing through unbalances (*Fig.* 8) to relieve high induced voltages or static charges, or with a simplexed dialing circuit, then circulating currents may flow to earth. These cur- in the line, i.e., bad splices, etc. create a voltage drop which sets up circulating noise currents. The rapid conversion to common battery dial service in rural areas is another good reason why series resistance unbalances must be kept to a minimum.

Use Of Gaseous Tubes

AN EFFECTIVE remedy for noise due to use of grounded ringers is the well known gaseous tube connected as shown in *Fig.* 9. These tubes have one serious disadvantage, viz: they may remain ionized after the ringing current has ceased. This is due to the high induced power voltage which tends to hold the tube ionized after it is initially started by the ringing pulse. thus defecting the purpose of the tube.

Whether or not gaseous tubes will prove an effective remedy for grounded ringer noise will for any particular case, depend on the length and type of parallel and in general can only be determined by actual field tests.

Conclusion

RURAL ELECTRIFICATION has provided the farmers with electricity and the telephone companies with a noise and shock hazard problem. The problem is one which can only be handled by first taking all the recognized precautions of building well balanced lines, properly transposing them and then seeing they are adequately maintained.

Inductive interference mitigation requires no knowledge of higher mathematics but only a good appreciation of the simple fundamentals of what causes noise on telephone lines and what to do to avoid it.—THE END.

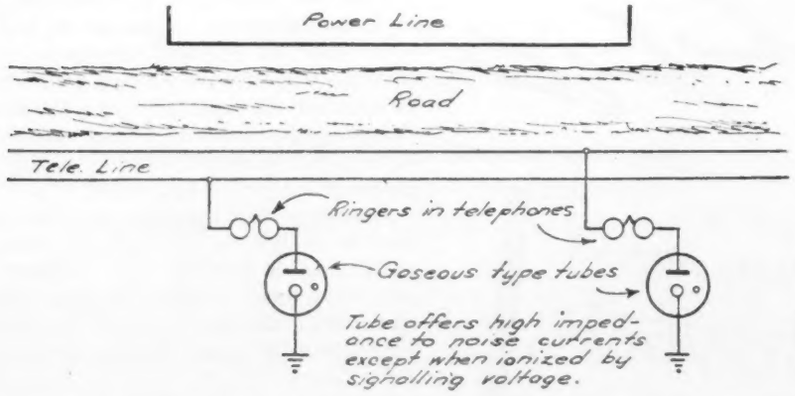
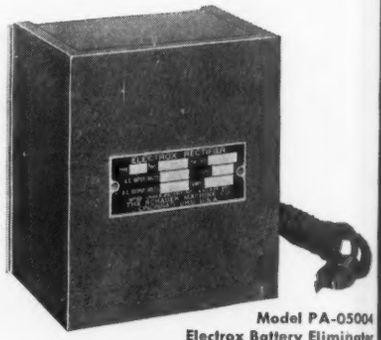

Power Line
Road
Tele. Line
Ringers in telephones
Gaseous type tubes
Tube offers high impedance to noise currents except when ionized by signalling voltage.

Fig 9—The gaseous tube is useful for isolating grounded ringers if induced voltage is not too high.

STROMB

24-hour guaranteed direct current, with electrox battery eliminator



Model PA-05004
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Designed specifically for the Operator's Circuit on Magnefo Switchboards, the PA-05004 type illustrated guarantees current even if your AC fails!

When operating from 110 volt, 60 cycle lighting circuit, it delivers a constant, humless direct current. If the alternating current supply fails, a built-in Power-off Relay automatically transfers the operator's circuit to stand-by dry cells.

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For durability, use DIAMOND C

because they're made in a new and modern plant

Something new has been added!—at Pineville, Louisiana—a modern, enlarged creosoting plant offering faster delivery and better-than-ever quality in telephone poles of this well-known, well-liked brand.

Diamond C poles are made of Southern pine, carefully selected from live growing trees and graded according to physical properties desired. Each pole is pressure-treated with 8 lbs. (or more if you wish!) of grade No. 1 Creosote Oil, in accordance with AWPA specifications.

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Time pull tests show that Never-Creep Anchors retain their holding power longer than any other type because they are unaffected by moisture seepage through the tamped earth. (See sketch).

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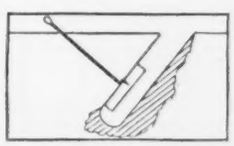

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Cook also manufactures a full line of fuses carrying "Telephone Rating." These fuses blow instantly at their rated capacity.

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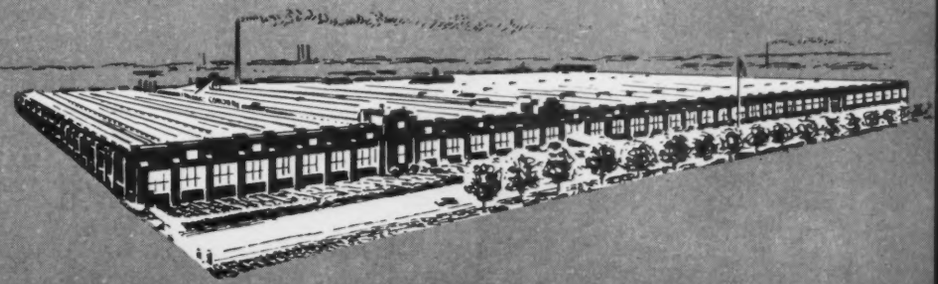

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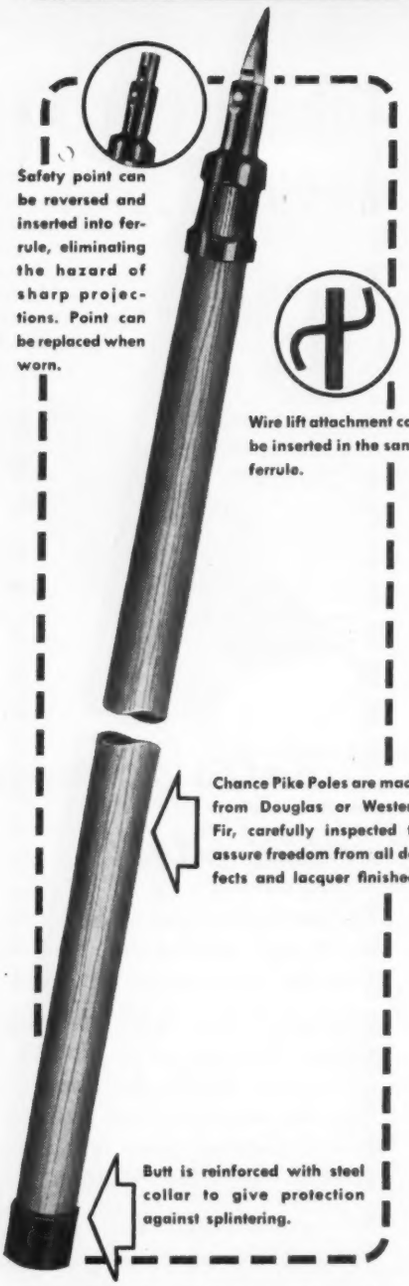
Safety point can be reversed and inserted into ferrule, eliminating the hazard of sharp projections. Point can be replaced when worn.
Wire lift attachment can be inserted in the same ferrule.
Chance Pike Poles are made from Douglas or Western Fir, carefully inspected to assure freedom from all defects and lacquer finished.
Butt is reinforced with steel collar to give protection against splintering.

Chance Safety Pike Poles are used for raising telephone and power poles and as ground braces in pole setting operations. With the Wire Lift Attachment they are recommended for maneuvering telephone, and low voltage secondary conductors, into position.

Ferrule and pike may be purchased separately.

A·B·CHANCE CO·
CENTRALIA, MISSOURI.

Rebuilding The Rural Outside Plant

(*Continued from page* 30)

is necessary in estimating the material and labor required to rebuild the rural leads and to determine the number of cable pairs to reserve in the exchange of the farm lines.

This grouping is accomplished by showing the location of present and prospective subscribers on a map prepared from a county map on a scale of ½" to 1-½" per mile and then drawing a boundary line around each selected group to represent subscribers and prospects to be served by one line.

An ideal grouping is one in which an average of eight parties are served by a single line. To allow for prospects that may order telephone service later on, set a maximum of ten and a minimum of six parties to each line. Thus each group should have eight subscribers and two prospects, seven subscribers and three prospects, or six subscribers and four prospects. The ratio of prospects to subscribers in any one group depends on the financial standing and the attitude of the prospects toward taking telephone service at some time in the future. If the prospect is a tenant renting a farm that is unproductive due to poor land or mismanagement and this farm is notorious for its heavy turnover in tenants, he would be considered a very unlikely prospect. On the other hand, if the prospective subscriber is a substantial farmer with a good credit rating in his community, he would be classed as a good prospect. There will, of course, be various classes of prospects in between these extremes. These facts are taken into consideration in determining the ratio of prospects to subscribers in any group.

To illustrate how such a grouping is accomplished, let us construct an imaginary map of the rural lines in the exchange, using the county map as the basis for constructing the plat. (A portion of this map is shown in *Figure* 2.) Indicate the location of the present subscribers by a small circle with the telephone number entered next to it. Show the location of subscribers, who have placed orders for telephones to be installed on completion of the rebuilding program, by a black dot or an "X." Use the letter P to denote prospects not taking telephone service.

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The TELERING is a small simple, highly efficient ringing machine at the remarkably low price of

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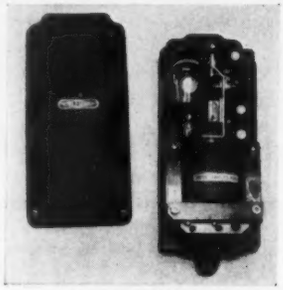

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Voltage Range for all purposes, central office and private branch exchange.

Considering the all inclusive features of this set there is no substitute.

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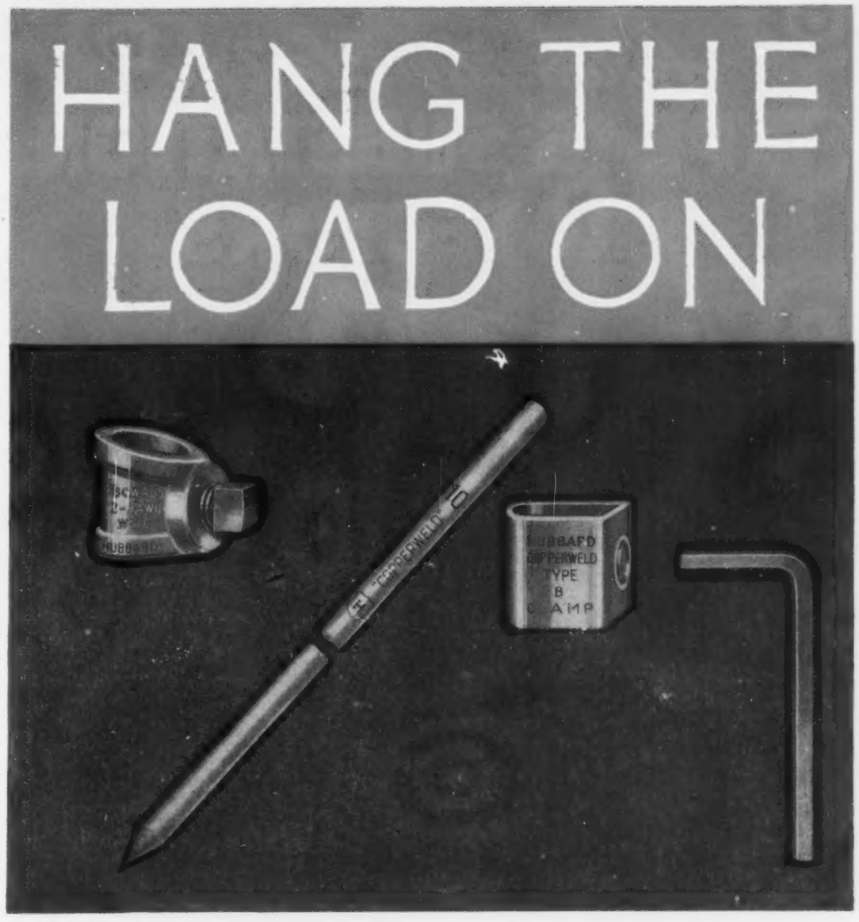
In the example illustrated in *Figure* 2, the subscribers in this area are served by three ground-return lines. Since there are 46 present subscribers in this area, the lines have an average of 15 subscribers each. These lines are too heavily loaded and it will be necessary to add more lines in the rebuilding program to accommodate the present subscribers plus eleven more on the waiting list and 23 prospects. In addition, all lines are to be made metallic (two-wire), in order to reduce noise induction from paralleling power lines.

Starting with the farthest end of the main lead and working back toward the junction of the open wires with the farm cable, group the subscribers and prospects as indicated in *Figure* 2. In locating the branch leads from the main lead to serve the subscriber groups, avoid having too many branches from the main lead or overextending the branches, as this will increase line construction costs. In some instances it may be possible to combine two parallelling branches on separate mile sections and carry two circuits in one lead instead of one circuit each in two separate leads. Such an arrangement would reduce the number of poles that would otherwise be required to carry the circuits. On the other hand, a roundabout route may be necessary to reach a group of subscribers when an unsatisfactory right of way condition would otherwise interfere with the economical construction of the lead in a more direct way. For example, a mile-long heavy hedgerow that cannot be removed or by-passed, because of subscribers' opposition, might force the choice of some other route for the lead, if there is a power line on the other side of the road, and it is not practicable to use tall poles or extension arms on poles on the hedge side of the road.

At the same time, care should be taken to keep the number of stations on each line within limits as previously explained. The regrouping is thus a cut-and-try process, with all possible combinations tried out in an effort to obtain the most economical grouping of subscribers possible.

In dial systems, the length of the lines should be limited to assure satisfactory operation of the switching equipment in the central office. This limit is specified by the manufacturer of the dial equipment and should be taken into account when planning the rural leads. For example, if the specified limit is 1000 ohms loop, the maximum length of a 109 steel wire line (HTL 85 or B.B.)

(*Please turn to page* 72)



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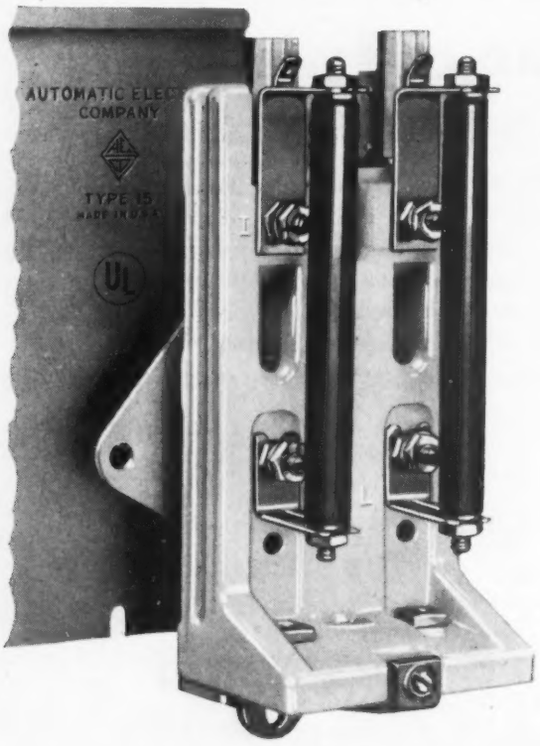

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would be approximately 15 miles from the junction with the exchange cable to the farthermost end, assuming the cable is quite short.

As the grouping progresses, mark each mile section of the pole leads with the numer of iron wires to be carried in the leads, thus 2-I, 4-I, 6-I(etc., as required, to indicate the number of wires to serve the groups. The number of wires will grow as the junction with the cable is approached. On completion of this grouping, the total number of wire circuits will be indicated by the number of groups shown on the map. In the example in *Figure* 2 eight lines are indicated with an average of 7 subscribers and 3 prospects per line. Eight pairs will have to be reserved in the exchange cable for these lines.

It should be noted that toll lines are not included in this discussion. The number of toll lines to provide will depend on the amount of toll business the small company handles. To assure good transmission on toll circuits, the details of toll lines and their termination at the exchange office should always be worked out with a large connecting company and their recommendations should be followed.

Preparing The Rural Plant Record Map

FOLLOWING the regrouping of the subscribers and the prospects the rural plant record map is prepared as indicated in *Figure* 3. The map in this form is essential in the inspection of the rural outside plant, as it indicates to the inspector what lines are planned for construction and thus enables him to determine the items of material needed. By actual inspection along the route of the main and branch leads and the farm spurs, he can judge, for example, how many poles are needed in a spur, what poles require raking or the placing of extension arms, to avoid tree contacts with the line wires, and where anchors will have to be placed. Such data, of course, cannot be accurately determined, when making up the map in the office.

After the inspection has been made, the map is corrected, where necessary, in accordance with the recommendations of the inspector, as for example, indicating the line relocated on the other side of a road to avoid obstructions or to be away from a power line. This map, as corrected, is given, together with work detail sheets, to the construction forces for reference in connection with the rebuilding of the outside plant. On completion of the rebuild-

(*Please turn to page* 74)

When nature cuts loose

ANY DAY OR NIGHT, anywhere in this country, storm, flood or fire can threaten telephone service. If disaster strikes, telephone people have both the will and the know-how to restore service *fast.* They've proved it time and again. Western Electric people are proud to be a part of this industry which has made such a fine record in meeting and beating emergencies.

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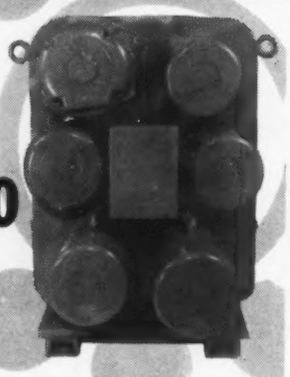

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ing program, the map is again brought up to date and final copies are kept in the office files to be utilized, as required, in line maintenance, locating trouble, and determining location of subscribers. At regular intervals, thereafter, the map is brought up to date to keep track of changing telephone numbers due to subscriber installations, discontinuances, and moves.

The plant record map (*Figure* 4) shows the following information:

(a) Rural and toll lines and farm spurs.
(b) Mile numbers and spur designations.
(c) Telephone number and location of subscribers.
(d) State, county, and exchange boundary lines (where present).
(e) Township and range numbers (T-12-N, R-8-E).
(f) Section numbers (1 to 36).
(g) Railroads, rivers, and creeks.

Rural leads are shown as medium heavy lines. Toll leads are drawn in heavy outline to distinguish them from the rural leads. Farm spurs are short lines from the main and branch rural leads shown connecting to subscribers' stations.

Mile numbers are arbitrary numbers, which identify each mile section (or half-mile section where line jumps to other side of road at this point) or the main and branch leads. These numbers are generally shown thus: for example, 1, 2, 3, for north lead out of town; 101, 102, 103, etc. for the east lead, 301, 302, 303 for the south lead, and 401, 402, 403, etc. for the west lead. Spur designations (A, B, C, etc.) indicate the location of farm spurs within each mile section of the rural lead.

Each subscriber is identified by a telephone number next to a small circle, which indicates his approximate location within a mile section of the lead. Telephone numbers in magneto exchanges follow a standard ringing code of a desirable form, such as that shown below.

Line No.	Station No.	Code
- -	10	——
- -	02	. .
- -	03	. . .
- -	04	. . . .
- -	11	— .
- -	12	— . .
- -	13	— . . .
--	20	— —
- -	21	— — .
- -	22	— — . .

General line ring ..... or .....

In dial exchanges the ringing code is determined by the type and make

CUT COSTS ON UNDERGROUND PIPING JOBS

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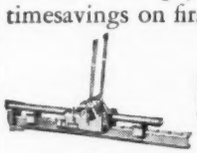
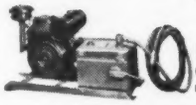
Installing pipe underground is quick and simple this way. With a GREENLEE Hydraulic Pipe Pusher *one man* pushes pipe through the ground—under streets, railways, walks, lawns, floors. Saves time, cuts costs through elimination of extensive ditching as just a short trench accommodates the Pusher. No tearing up of pavement, lawns, floors... eliminates tunneling, back-filling, tamping, repaving. Cuts job time to a fraction. Pusher often pays for itself through timesavings on first job or two.



No. 790 GREENLEE PUSHER For 3 4 to 4-inch pipe. Six speeds—5,600 to 40,000 lbs. pushing pressure.

No. 795 GREENLEE PUSHER For pipe larger than 4-inch, concrete sewer pipe, large drainage ducts. Six speeds—25,000 to 150,000 lbs. pushing pressure.



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Surprises

AFTER a serious or fatal accident, the foreman often is surprised to learn that the cause of it was violation of a rule which he thought his men were consistently following. Upon further investigation he finds the violation a common practice with not only the victim but also other members of his crew.

When the superintendent hears, gets the story, and learns the results of the investigation he, too, is greatly surprised to find that one of his foremen has been so lax as to allow the violation to occur and recur.

The next surprise comes to the manager, who wonders why the superintendent did not spot the violation long ago and put a stop to it. And so it goes, on up the line.

Such surprises are all too common in organizations which appear to be efficient. Who is to blame and how may these situations be stopped? Is it unfair to say that the blame should be shared, all the way up and down? Each man is responsible because he complacently assumes that all is well and because it takes an accident to show him otherwise.—Safety Bulletin

of the switching equipment used and is specified by the manufacturer.

The state and county boundary lines are present on the county map. The exchange boundary lines define the limit of adjoining telephone exchanges and enable the telephone company to determine whether a farm prospect is eligible to take telephone service in this company's area.

The remainder of the information pertaining to township and range numbers, etc. are obtained from the county map.—*(To be continued)*

Part II of Mr. Reed's series will appear in the May, FORTNIGHTLY TELEPHONE ENGINEER, and will discuss—(1) Inspection of the outside plant, and (2) determination of material & labor costs.

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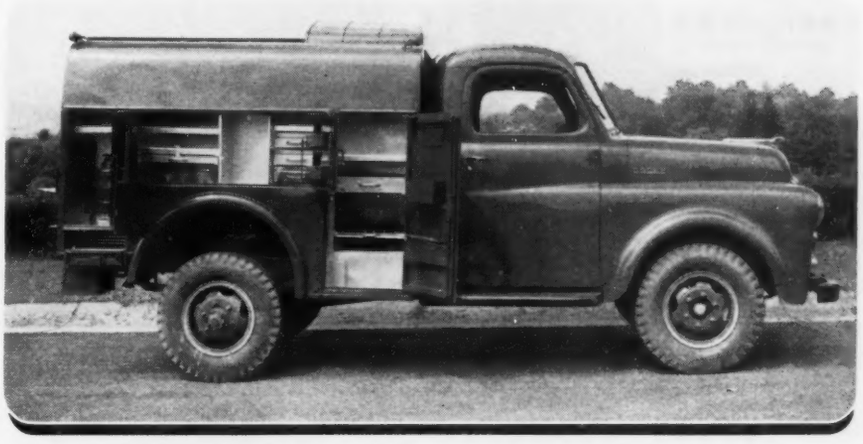

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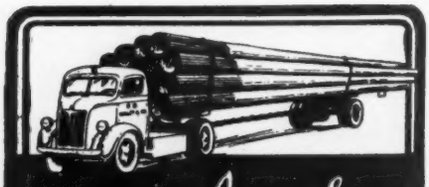

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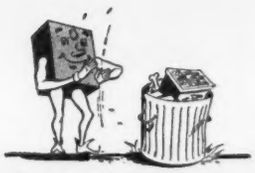
He served as sales manager for Line Material's Kyle Products Plant since 1947, and previously had 17 years of varied engineering experience with utility companies in California and Michigan.

Richard Kirk succeeds Delaney as manager of Kyle products sales. He will supervise sales of oil circuit reclosers, sectionalizers, oil switches,

RICHARD KIRK



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and connectors, made by the Kyle Products Plant, South Milwaukee, Wisconsin.

Mr. Kirk was formerly apparatus engineer, Line Material, south central sales division, Birmingham, Alabama. Before joining the Line Material organization, he taught mathematics and engineering at South Carolina State College. He gained wide experience in electrical transmission and distribution engineering while working for several large electrical manufacturers and the Virginia-Carolina Utility Committee.

New Chief Engineer For Cannon Electric

Vice-President and General Manager Robert J. Cannon of Cannon Electric Development Co., Los Angeles, Calif., has announced the appointment of Roger Bowen, formerly with the U. S. Signal Corps as the new head of the company's engineering department.

D. Frank Jackson, who has been acting chief engineer since the death of Edward Neifing in 1947, longtime chief engineer for Cannon Electric, will continue in the engineering department as chief assistant to Mr. Bowen.

Mr. Bowen is a graduate electrical engineer from Iowa State University where he received his B.S. in 1932.

Gould Storage Battery Issues Helpful Bulletin

The Gould Storage Battery Corporation, Trenton, N. J., has published an informative, helpful bulletin giving detailed instructions on the installation and operation of glass jar batteries for stand-by service, control, telephone, telegraph, emergency lighting, fire alarm and other stationary installations. The new 8½ x 11 bulletin includes three sections on installation, nine on operation, and a complete table of finish charge rates and 8-hour discharge rates for 97 different battery sizes and types.

The three sections on the installation of Gould glass jar batteries cover unpacking and checking, selecting the battery location, and applying the initial freshening charge. These sections tell how to align cells and give instructions for cleaning contact surfaces and bolting connectors on battery terminal posts.

The nine sections on operation and care cover both glass jar batteries that operate by the floating method of charge and those that are charged periodically. Each charging method is described under a separate head-

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ing, and the method of applying an equalizing charge to floated batteries is explained in detail. Since the battery must supply the entire current load in event of failure of normal power, specific instructions are given for charging after an emergency discharge.

Two sections discuss record-keeping and temperature correction of hydro-meter readings when measuring the specific gravity of the electrolyte. The last section on battery care gives ten valuable suggestions which, if followed, promote long, reliable battery service with maximum utilization of full current capacity.

The full-sheet table on the last page gives the normal finish charge rate in amperes and the normal 8-hour discharge rate to 1.75 full voltage at 77°F for all 97 sizes and types of Gould glass jar stationary batteries.

Plant engineers, power supervisors, and maintenance foremen will find the new bulletin a valuable guide to the care and maintenance of glass jar stationary batteries in power and service installations. A copy of Bulletin GB932 may be obtained by writing the Gould Storage Battery Corporation, Trenton 7, New Jersey.

Mayrod Distributors Incorporates In New York

Articles of incorporation were filed with the office of the secretary of state, Albany, N. Y., February 17, 1950 for Mayrod Distributors, Inc., wireless telegraph and telephone instruments. Capital stock was listed at 600 shares no par value. Directors are Marvin B. Morrison, 121 Winston Rd., Louis B. Morrison, 1658 Amherst St., and Helen Hapke, 870 Lafayette Ave., all of Buffalo, N. Y.

Electric Products Co. Advances E. G. Schroeder

G. J. Berry, vice president in charge of sales, of The Electric Products Co., has announced the appointment of E. G. Schroeder to the position of sales manager of The Electric Products Co. In his new position, Mr. Schroeder will be responsible to Mr. Berry for all headquarters and field direct sales activities.

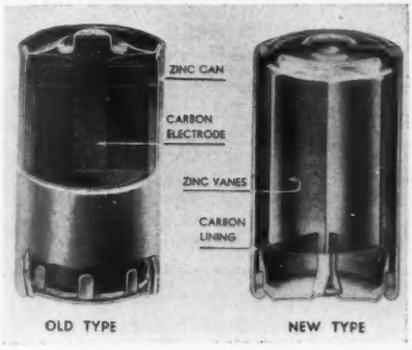
Previously associated with The Electric Products Co. as field sales manager, and prior to that position, district manager of its Detroit office, Mr. Schroeder has a broad industrial sales background.

A graduate electrical engineer of

Renssaeler Polytechnic Institute, Mr. Schroeder was associated with the New York Electric and Gas Corp. and The General Electric Co. before joining The Electric Products Co. in 1945.

Revolutionary Industrial Flashlight Battery

The first major improvement in flashlight batteries in the past 50 years is announced by National Carbon Division, Union Carbide & Carbon Corp. The construction of the new "Eveready" No. 1050 industrial battery is "inside out". The container, formerly made of zinc, is now made of carbon, with a zinc



Cut-away view of old and new container.

power vane as the center element, as shown in the cut-away view. The old-type construction consisted of a zinc can container and a carbon rod center electrode.

Unlike the zinc container of the old cell, carbon is inert to electrolytic action and hence will never perforate, irrespective of battery age or degree of discharge. The new cell has no metal can to leak or corrode. According to the manufacturer it will not swell, stick or jam in the flashlight.

The outstanding service feature of the new No. 1050 flashlight cell of interest to the utilities is that it gives more light-minutes than any previous "Eveready" cell, providing more than double the usable light. Usable light is defined as the amount of brilliant white light available before the battery becomes too spent to produce light of useful efficiency.

Emphasis is placed on the fact that the new battery is completely interchangeable with all D-size (standard flashlight size) batteries so that no change need be made in lamps or cases.

The new "Eveready" No. 1050 industrial flashlight battery is manufactured by National Carbon Division, Union Carbide and Carbon Corporation, 30 E. 42nd Street, New York 17, N. Y.

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Transmitter, Kellogg No. 22, at $1.25 each.

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Help Wanted

HELP WANTED: Man capable of rebuilding magneto and PBX switchboards. Telephone Repair & Supply Co., 1760 N. Lunt Ave., Chicago 26, Illinois.

HELP WANTED: Experienced plant superintendent with some engineering knowledge. 3000 station exchange northern Indiana. Address Box No. 8667 c/o Telephone Engineer Publishing Corp., 7720 N. Sheridan Rd., Chicago, Ill.

HELP WANTED: Salesman to call on the telephone companies in midwestern states. Give experience and achievements in detail, also enclose snapshot. Suttle Equipment Co., Lawrenceville, Illinois.

For Sale

FOR SALE: Magneto wall sets, compact type with rebuilt transmitter and receiver. Serviceable condition and tested before shipment. A bargain at $10.00, F.O.B. Chicago. Write or call Clark-Jarvis Telephone Equipment Co., 7367-69 North Clark Street, Chicago 26, Ill.

FOR SALE: Telephone Exchange, 190 Magneto stations, 57 miles of line (some metallic). Lot with house, garage, supplies and tools. In town of 350 population. Price less than 1949 gross of $8300. Contact Emil Wendtland, Dickens, Iowa.

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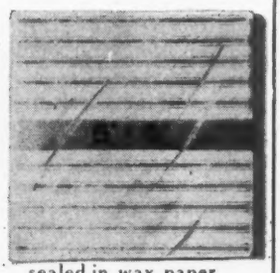

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NOTICE TO CONTRACTORS

GENERAL SERVICES ADMINISTRATION
Community Facilities Service
Washington 25, D.C.

Sealed proposals will be received by Rufe B. Newman, Jr., Director, Public Works Construction Division, Community Facilities Service, General Services Administration, Room 5143, General Services Building, Washington, D. C., until 11:00 o'clock A.M., Eastern Standard Time, on May 24, 1950, for the construction of telephone and radio link facilities and buildings on the islands of St. Thomas and St. Croix (U.S. Virgin Islands) as follows:

PROJECT No. 53-113
ST. THOMAS TELEPHONE SYSTEM
(Project No. 13, Public Law 510, 78th Congress)

Subproject 13A
Outside Telephone Plant, St. Thomas
Subproject 13B
Inside Telephone Plant, Charlotte Amalie
Subproject 13C
Subscriber Telephone Plant, St. Thomas
Subproject 13R
Radio Link Stations, Virgin Islands
Subproject 13X
Telephone Exchange, Charlotte Amalie

PROJECT No. 53-509
ST. CROIX TELEPHONE SYSTEM
(Project No. 26, Public Law 510, 78th Congress)

Subproject 26A
Outside Telephone Plant, St. Croix
Subproject 26B
Inside Telephone Plant, Christiansted and Frederiksted
Subproject 26C
Subscriber Telephone Plant, St. Croix
Subproject 26X
Telephone Exchanges, Christiansted and Frederiksted

at which time and place the proposals will be publicly opened and read aloud. Bids received after closing time of bid opening will be returned unopened.

Plans and specifications and other proposed contract documents are open for public inspection at the District Engineer's Office, Charlotte Amalie, St. Thomas, U. S. Virgin Islands; the District Engineer's Office, 501 Banco Popular Building, San Juan, Puerto Rico and Room 5130, General Services Building, Washington, D. C. A set of such documents may be procured from any of the above-listed offices upon deposit of $50.00, all of which will be returned to bona-fide bidders upon the return of plans and specifications, in good condition, within seven days of date of bid opening.

Each proposal must be accompanied by a bid security in an amount not less than 5 percent of the total bid.

Bids will be accepted on any single subproject or project.

The successful bidder(s) will be required to furnish performance bond(s) in an amount equal to 100 percent of his (their) bid(s) and payment bond(s) in an amount equal to 100 percent of his (their) bid(s); such bonds to cover full performance of the contract(s) and payment(s) for labor and materials.

No proposal may be withdrawn after the scheduled closing time for receipt of bids for at least 30 days.

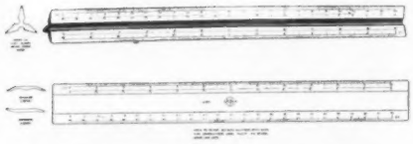
The Government reserves the right to reject any and all proposals and to waive informalities with respect thereto.

PERE F. SEWARD,
Commissioner

ADDITIONAL Information on New Products or Service and Supplies of any Advertiser listed in this section may be promptly obtained by filling out the handy request for more information reproduced on the opposite page. All items are numbered. Check number of items on which more information is desired and send to Telephone Engineer Publications. Kindly mention Telephone Engineer Publications when contacting advertiser direct.

the New Products Showcase

New Products & Supplies of Practical Interest



Of interest to draftsmen and other users of measuring scales is the line of All-Metal Triangular and Flat Scales.

Three basic Accuracy Characteristics offered by these white-surface, all-metal scales are: (1) Accuracy in Design—the position of each graduation is computed to 7 decimal places for engine engraving on a "Master" at 68° Farenheit; (2) each scale is an exact duplicate of its "Master" with needle-sharp graduations in black against a white background; (3) each light, all metal scale has an even coefficient of expansion throughout of 0.0000135 per degree of Farenheit temperature—thus assuring permanent retention of accuracy.

The surfaces of the Triangular Scales form an "Inverted-V" which brings the fine edges of the scales right down to the paper for easy, accurate measurements without the flat surfaces ever touching the work. Both Models B-160 Architects and B-161 Engineers Scales are 12-inches in length, weigh approximately 4 ounces.—Check New Product 228.

ADVERTISING, Directories—General Telephone Directory Co., 604 Pine Ave., Long Beach, Cal., and 185 N. Wabash, Chicago, Ill.—[ADV. 4]

ANCHORS, Plastic Expanding, Universal. All Purpose—Mount in any Material, Holub Industries, Inc., 424 DeKalb Ave., Sycamore, Ill.—[ADV. 5]

ANCHORS & WIRE CONNECTORS—Matthews Scrulix Anchors, Matthews Telephone Wire Connectors. Write for bulletins. W. N. Matthews Corp., St. Louis 16, Mo.—[ADV. 6]

BATTERIES, Dry Cell—The Ray-O-Vac Company, 2317 Winnebago St., Madison, Wisc.—[ADV. 7]

BATTERY—WATER UNITS Demineralizers For Tap Water—A. E. Tomkin & Co., 1828 Columbia Rd., N.W., Washington 9, D. C.—[ADV. 8]

BELTS — CLIMBERS — COMPLETE LINEMEN'S EQUIPMENT, W. M. Bashlin Co., Bashlin Bldg., Grove City 1, Pa.—[ADV. 9]

BOOTHS—Acoustic Telephone—Sherron Metallic Corp., 1201 Flushing Ave., Brooklyn 6, N. Y.—[ADV. 10]

BOOTHS—Churchill Cabinet Co., 2119 Churchill St., Chicago 47, Ill.—[ADV. 11]

BRUSHES—Resistance Materials—Powder Metallurgy Parts—Keystone Carbon Co., Inc., Saint Marys, Penna.—[ADV. 12]

CABLE, All Plastic, Aerial, Duct, Direct Burial, PBX, Switchboard.—The Ansonia Electrical Co., Ansonia, Conn.—[ADV. 13]

CABLE SPINNING—The Cable Spinning Equipment Company, 432 Crane St., Topeka, Kans.—[ADV. 14]

CABLE TERMINALS—Channel Splicing Machine 2415 Roanoke Rd., San Marino, Calif.—[ADV. 15]

CARRIER EQUIPMENT—Adler Telephone & Telegraph Carrier Equipment has been standard for twenty years in the Independent Field. Mfd. only by Southern Electric & Transmission Co., 3127 Holmes St., Dallas, Texas.—[ADV. 16]

CLAY CONDUIT, UNDERGROUND—Furnished in 1-2-3-4-5-6-8 and 9 duct conduit in 3¼"bore. Brazil Hollow Brick & Tile Co., Inc., Brazil, Indiana.—[ADV. 17]

CONNECTORS, CABLE—Cannon Electric Development Co., 3209 Humboldt St., Los Angeles 31, Calif.—[ADV. 18]

CORDS, Instrument and Operators—Commercial Cord & Supply Co., 26 Main St., Clifton Springs, N. Y.—[ADV. 19]

CORDS, Switchboard & Telephone—Runzel Cord & Wire Co., 4727-31 Montrose Ave., Chicago 41, Ill.—[ADV. 20]

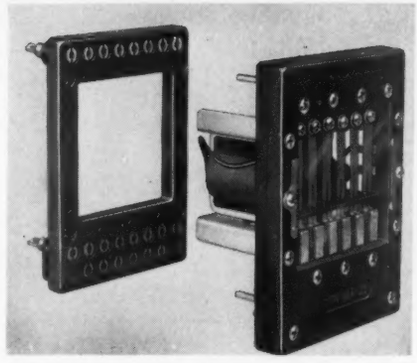
CROSS ARMS—American Cross-Arm, Inc., 141 W. Jackson Boulevarl, Chicago, Ill.—[ADV. 21]

"EARTH BORING MACHINES" Sterling Model "A"—Precision Engineered and Hydraulic Controlled. Sterling Engineering & Mfg. Co., 173 Gilligan St., Willkes-Barre, Pa.—[ADV. 22]

ELECTRIC HOT WATER HEATERS, Thermostatically controlled for any hot water heater, Vulcan Electric Co., Danvers 17, Mass.—[ADV. 23]

ENGINEERING, Construction—Neale Construction Company, 432 Crane St., Topeka, Kans.—[ADV. 24]

New half pint, self-pressure torch—complete with many big torch features—is designated as the No. 59 for gasoline and No. 60 for alcohol. Chief among its outstanding features is the fact that it is complete with soldering iron rest and windshield. The high-polished, heavy gauge brass tank of this new model is 3½" in diameter—a feature which minimizes tipping. The tank holds 7½ ounces of fuel and the torch will burn 3½ hours full open at a temperature of 1700° by pyrometer reading. This torch does not require a pump as a brass wire—interwoven with the wick—conducts heat from burner into the tank.—Check New Product 229.



Originally designed and built as a basic component of the Harvard University's Mark II Calculator (the 'Mechanical Brain") for the Navy Department, the Autocall Company's ultra-high-speed "HHA" Relays have just been released for general use.

These Relays are built for long life (100 million operations, minimum) at high-speed (6 to 8 milliseconds), and their design incorporates many features. For example: there is no pile-up of contacts. Instead, six single-pole double-throw contacts are arranged side-by-side to provide 28 different contact combinations. Contacts are not bent to provide pressure as in conventional relays; instead, a coiled beryllium spring in the face of the "HHA" core presses against the back of the armature to provide the needed pressure without bending the contacts.

There are no connections soldered to the contacts—the individual contacts and prongs are of one-piece construction, and each contact provides its own prong for jack-connecting to the circuit. All contacts are fully protected, yet are plainly visible through the glass cover which is set in the bakelite frame of the Relay. Coils can be furnished for 24 to 150 volts, direct current, with no increase in price for the various voltages.—Check New Product 230.

FLASH LIGHTS, Carpenter Mfg. Co., 222 Master-Light Bldg., Boston 45, Somerville, Mass.—[ADV. 25]

FLOOR DUCT—The Versatile Floor Duct, Ask your jobber or write, Winders & Geist, Inc., P.O. Box 633, Lincoln, Neb.—[ADV 26]

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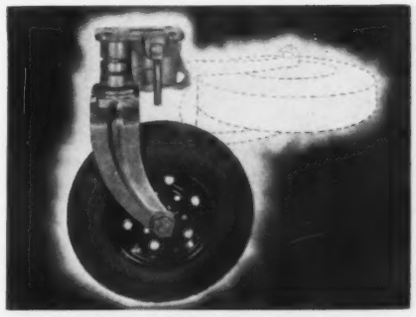

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New Bulletin Describes Tufcrete Resurfacer

A new six-page folder, just issued by the Tufcrete Company, Des Moines 9, Iowa, describes the uses of Tufcrete Resurfacer, indoors or out, on worn floors of wood, concrete, brick, asphalt, stone, etc., either for patching or a complete new surface. Also for sidewalks, especially over areaways in front of stores, for steps, expansion joints, tennis courts, concrete window sills, platforms, ramps, spalled columns and beams, reservoirs and tanks, swimming pools, etc.

Tufcrete is described as an asphaltic-base liquid which, added to a concrete mixture will bond to concrete, wood or other floors, both bottom and edges, will feather-edge perfectly and stand up under heavy traffic. Requires no chipping of ruts or holes, no heating of materials, no expensive tools, can be installed by ordinary labor . . . applied to worn aisles and runways without removing stock, work benches, storage bins, or machinery set in place.

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New Marmon-Herrington Engineering Vice-Pres.

George H. Freers widely known automotive engineer and former chairman of the Indiana Section of the Society of Automotive Engineers has been promoted by the directors of the Marmon-Herrington Co., Inc., to vice-president in charge of engineering.

For the past 10 years, including the period of the company's complete conversion to the manufacture of military vehicles during the war, Mr. Freers has held the position of chief engineer.

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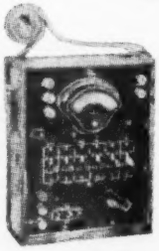

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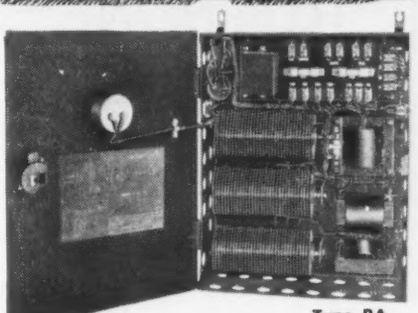

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MANUFACTURED to the exacting standards of the telephone industry, the Type RA ELECTROX Constant Voltage Battery Eliminator will deliver direct current of suitable smoothness for operating lamp signal and automatic switchboards without the use of batteries.

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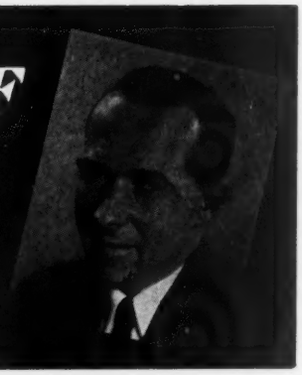

By JOHN G. REYNOLDS
Managing Editor

"Speak Plainly" . . . A St. Louis newspaper poked a little fun at Texans and their way of talking in the following article, based on an incident at McAllen.

"A funny thing transpahred in McAllen, Texas, the other day," the Star Times said. "A woman got on the wahr and tried to telephone the nearby town of Pharr. The hahred hand on the switchboard thought she was reporting a fahr. So, without stopping to inquahr, she sounded a fahr alarm and aroused the entahr community. Most of the volunteer fahr fighters had already retahred. They began to perspahr and struggle into their fahrfighting attahr. It was the nicest little mixup you could desahr.

"It just goes to show how important it is to speak plainly. Some people are used to damyankee accents. So remember, when you mean Pharr, say Pharr. And when you want to report a fahr, say fahr—make it rhyme with tahr—you know, the thing you put on your automobile wheel." . . . Like Mollie Magee, all we can say is "Pharr goodness sakes!"

• • •

The Big Difference . . . A new insight into the vast difference between a regimented and a free economy was recently given by Paul H. Nystrom, Professor of Marketing, Graduate School of Business, Columbia University. Dr. Nystrom is an internationally celebrated authority in his field.

"Under a state controlled economy," he said, "or under conditions of absolute monopoly, the burden of negotiation and of effecting exchange falls upon the buyer. The buyer must seek out the sources of supply. He can only buy what is made available to him. He must pay the price that is asked or go without.

"In a competitive economy, such as we have, when there are adequate supplies of goods and conditions are normal, those who have goods to sell, or their representatives, must look up to the customers. . . . The customer is under no obligation to buy. He buys only what he wants. He buys in accordance with his own decisions. . . ."

What this means is that the customer is the boss in our kind of economy. He shops where he pleases—in a chain store, an independent store, a specialty shop, through the mails. He picks and chooses. He looks for the best service, the lowest price, or some other attraction. His trade must be earned or he will take it elsewhere.

That is the big reason why a free economy produces abundance while controlled economies produce only scarcity.

• • •

Good Neighbor . . . Southern Telephone News reports on the subscriber who was put on a two-party line, and wrote a letter to the people who were already on the line. It was such an interesting exhibition of the right spirit that it merits publication. The letter said:—"Having just installed a telephone in my home, I find that you and I share a two-party line. I am glad to have you as a telephone neighbor, and we will endeavor to use the phone in a reasonable manner. I want you to know that if at any time, we are using the telephone and you desire its services, all you will have to do is to break in on the conversation and let this be known, and we will be only too happy to release it for your benefit."

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2500A	3Ø,210–250V	100.0 amp. 24V	32x22x60	Floor
1250B	3Ø,210–250V	25 amp. 50V	23x15x45½	Relay Rack
2500B	3Ø,210–250V	50 amp. 50V	32x22x60	Floor
3750B	3Ø,210–250V	75 amp. 50V	32x22x60	Floor
5000B	3Ø,210–250V	100 amp. 50V	36x26x72	Floor

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